Forskningsrådet för miljö, areella näringar och samhällsbyggande, Formas
The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning

Assessment of projects funded by the Swedish-Norwegian Foundation for Equine Research (SHF) 2004-2011

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Foreword

In August 2011 the board of the Swedish-Norwegian Foundation for Equine Research (SHF) asked the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (Formas) to review the research supported by the SHF. The Foundation was established in 2004 and has since administered steadily increasing amounts of funding contributions from the equine industry in Sweden and, from 2009 onwards, also Norway. Formas has also contributed to the Foundation since 2006.

The scope of the review was scientific quality, relevance for the equine industry and the dissemination of research results from all projects granted funding and that had submitted final reports prior to September 2011. A Nordic cross-disciplinary assessment panel was formed, which included veterinary, agricultural and behavioural competences as well as social sciences and representatives from the equine industry.

Formas would like to thank the members of the panel: **Cecilie Marie Mejdell**, Norwegian Veterinary Institute, **Jens Malmkvist**, Aarhus University, **Eva Söndergaard**, AgroTech A/S, **Eric Clausen**, Knowledge Centre for Agriculture and **Elisabeth Olsson**, The Swedish Warmblood Association (ASVH) for their valuable work.

Formas would particularly like to thank the Chair of the panel, **Gertrud Jörgensen**, University of Copenhagen, for her exemplary assessment work and her enthusiastic way in which she led the progress of the work of the panel.

Viktoria Halltell and Bengt H Ohlsson represented Formas.

Rolf Annerberg
Director General, Formas

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Summary

In 2011 the board of the Swedish-Norwegian Foundation for Equine Research (SHF) commissioned the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (Formas) to review the research funded by the SHF.

The scope of the review was scientific quality, relevance for the equine industry and the dissemination of research results from all projects that were granted funding and had submitted final reports prior to September 2011. A Nordic cross-disciplinary assessment panel was formed, which included veterinary, agricultural and behavioural competences as well as social sciences and representatives from the equine industry.

The ambitions of Nordic equine research are high — to be world-leading. However, the Nordic countries are small and there are only a small number of scientists working in the area of equine science. The panel is therefore positively disposed to the concept of pooling research funding, not only between Sweden and Norway, but among the Nordic countries in general. A common platform for Nordic equine research would be a good forum to facilitate applications for EU-grants for equine-related research projects. This may be one way to realise the ambitious goal.

In general the panel found the research funded to be of high scientific quality, high relevance and in most cases also well disseminated. Problems were observed in a small number of projects and the recommendation of the panel is therefore that the committee pays specific attention to the following themes in applications: Robust methodology; Experienced researcher and young researcher representation in research teams; Plans for the dissemination of information to increase the potential for implementation, e.g. that information about results are spread via the teaching of professionals, and Nordic and international co-operation.

The panel recommends SHF to maintain a high emphasis on usability, relevance and implementation, but also continue to provide scope for more basic research-based and explorative projects, both of which may have a high potential for future utilisation.

The panel also recommends that the strategy, programme and application guidelines, as well as the processing by the committee takes into account that projects should cover a broader research field – or that SHF clearly defines its priorities. Some of the fields that the panel was surprised to find had been omitted were, for example, equine industry economics, environmental issues, and behavioural studies related to equine husbandry and training.

In conclusion the panel would like to advise that each application should state the potential impact of the research on the welfare of the horse, even if this does not form part of the core framework of the project.

1. Introduction

1.1 The task

In August 2011 the board of the Foundation for Equine Research (SHF) commissioned Formas to review the research supported by the SHF. The Foundation was established in 2004 and has since had at its disposal steadily increasing amounts of funding contributions from the equine industry in Sweden, and from 2009 also in Norway. Since 2006 Formas has also contributed to the Foundation.

The assessment was intended to encompass scientific quality, relevance to the equine industry and the dissemination of research results from all projects that were granted funding and had submitted reports prior to September 2011. The assessment should be completed in May 2012 and reported to the SHF board members at their meeting on June 1st 2012.

1.2 The assessment panel

A Nordic cross-disciplinary review panel was formed, which included veterinary, agricultural and behavioural competences as well as social sciences and a representative of the equine industry.

Photograph: Viktoria Halltell

The panel (from left to right):

Senior Scientist **Cecilie Marie Mejdell**, Norwegian Veterinary Institute, Department of Health surveillance, Norway

Senior consultant **Eva Söndergaard,** AgroTech A/S, Danmark

Elisabeth Olsson, Swedish Warmblood Association (ASVH), Sweden

Senior Scientist **Jens Malmkvist**, Department of Animal Science, Aarhus University, Denmark

Professor **Gertrud Jörgensen**, (Chair), Center for Forest, Landscape and Planning, University of Copenhagen, Denmark

National consultant **Eric Clausen**, Knowledge Center for Agriculture, Horses, Denmark

1.3 Data gathering and methodology

The scope of the assessment review was scientific quality, relevance for the equine industry and the dissemination of research results from all projects that were granted funding and had submitted final reports prior to September 2011.

Formas sent out a survey questionnaire to all project leaders who had submitted final reports prior to September 2011. The survey questionnaire was sent to the 54 completed projects and was answered by 43 of the project grant recipients (see chapter 3 for further information). Data gathered from the survey questionnaires has given the panel an excellent and current overview of the 43 research projects, their staffing, research questions, methods, data and results, and has also allowed the assessment of publications and dissemination of information that may have been performed after the official completion of the respective projects.

The questionnaire can be found in Appendix A

In addition, data for all projects could be accessed via the website of Stiftelsen Lantbruksforskning (SLF) – The Swedish Farmers' Foundation for Agricultural Research – (SLF supplies the electronic application system also used by SHF) where the panel could gain access to a summary of the application, a summary of the results, and to the final research project report for each granted application. This information is also accessible to the general public. (http://www.lantbruksforskning.se, "Projektbanken").

An assessment form reflecting the more detailed assessment criteria of the panel was developed, and all projects were assessed in accordance with these criteria. For each category a score rating of 1 (not satisfactory) to 5 (excellent) was awarded. The evaluation criteria included:

- ***Scientific quality***: The quality of the research question, research methods, scientific merits of the staff, publications, international co-operation, and inclusion of young researchers in the project.
- ***Relevance:*** The importance of the research for the industry and for horse welfare in terms of new knowledge, usability, application and implementation of results.
- ***Dissemination*** to users, nationally and internationally.

The assessment criteria form can be found in Appendix B

Each project was assessed in detail by the two panel members judged to have the best subject-related and methodological competencies for the specific project. All panel members were however expected to have an adequate overview of all projects. In some cases the panel members consulted external experts. This comprehensive project assessment forms the basis of the entire assessment review. However, the individual assessments have only been used as basic data for the panel and the assessments of the individual projects are therefore not included in this report.

As an introduction to the work, the panel was given a thorough oral presentation of the organisation and work of the SHF. Further information about the organisation of the SHF, its research strategy 2009 to 2012 and the current research programme (R&D) is available by going to: http://www.nshorse.se/cm/forskning.

2. The Swedish-Norwegian Foundation for Equine Research, SHF

The Swedish Foundation for Equine Research was established in 2004, based on contributions from the Swedish equine and agricultural industries. The Swedish Research Council Formas has provided 50 per cent funding since 2006. During 2009 funding increased due to the addition of contributions from the Norwegian equine industry and the Norwegian Research Council for research funding. In conjunction with this the name of the foundation was changed to the Swedish-Norwegian Foundation for Equine Research. Today the Foundation administers approximately MSEK 21 annually for the funding of research projects.

The Foundation is based on the tenet that at the same time as the number of horses in Sweden and Norway has increased considerably, the use and function of horses in society has changed towards a more recreational – even rehabilitational focus - and more urbanised status, including the horse as a prerequisite for sports and competition. This provides new business opportunities, but also to potential new welfare problems and environmental conflicts.

The main purpose of the foundation is to contribute to creating value for horses, for the equine industry and for humans and society; to increase the understanding and profile of the role of the horse in society; and to improve the health and welfare of horses and humans. In addition the research should contribute to identifying new business areas in the horse industry and in horse based agriculture.

The research that is funded should therefore be applied research of very high scientific quality that can contribute to the previously named goals.

One of the strategic goals of the foundation is to support the Nordic equine industry in its endeavours to become world leading – initially by joint collaboration between Sweden and Norway and subsequently also by the participation of other three Nordic countries in the world leading Nordic equine research collaboration entitled 'Nordisk hästforskning – ledande i världen'.

The research programme is divided into three main category areas:

- Equine health, performance and welfare.
- Equine reproduction, breeding and feeding.
- The role of the horse for humans, society and the environment.

Although the descriptions of the research areas have developed over time, the areas themselves, together with the primary objectives, have remained relatively constant over the years.

Applications are evaluated by the SHF research committee that consists of 12 ordinary members from different research disciplines (the majority having agricultural and veterinary backgrounds) and from the equine industry.

SHF decides on the awarding of research grants once each year. The applications are evaluated according to the following criteria:

- Research topic
- Materials and methods
- Competence of all project staff
- Cost calculations
- Degree of prioritisation
- Dissemination of results

These criteria to a large extent overlap with the assessment criteria used by the assessment review panel. All members of the research committee rate the criteria for each project and award a score on a scale of 1 to 6 (with the exception of cost calculations that are scored using a scale of 1 to 3). The joint priorities for each project are then summarised at the annual meeting. Finally, the SHF board determines the order of priority and decides on the awarding of grant funding. This method is in good agreement with the general principles and practices of Formas for the evaluation of applications.

3. Overview of the research projects included in the assessment review

The panel had access to 43 completed and returned survey questionnaires from projects that had been completed prior to November 2011. The projects are listed below; together with the main research area that the panel assessed the respective projects belonged to.

Table 1: List of the research projects included in the assessment

Project number	Name of applicant	Project title	Main research area*
447002	Gabriella Lindgren	Genetic study of a developmental skeletal defect in the Shetland pony	1.1
447005	Peter Franzén	Studies of Equine Ehrlichiosis	1.1
447038	Carina Ingvast-Larsson	Clinical Evaluation of Antihistamine to Horses with Sweet Itch	1.1
447041	John Pringle	Markers of inflammation within bronchial tissues in horses with recurrent airway inflammation	1.1
447046	Pia Larsson	Studies of transport proteins of relevance for disposition of drugs in horse	1.1
447057	Bengt Guss	Studies of Streptococcus equi with the aim of developing methods to prevent strangles	1.1
447061	Viveca Båverud	New PCR-diagnostics for strangles	1.1
H0547030	Carina Ingvast-Larsson	Clinical Evaluation of Antihistamine to Horses with Sweet Itch	1.1
H0547075	Katarina Nostell	Cardiac troponin I as a biomarker for myocardial injury in horses	1.1
H0647157	Lena Elfman	Particle load in the stable environment - impact on human and equine airway inflammation.	1.1
H0647176	Eva Wattrang	Equine dental caries - studies on the immune response to Streptococcus devriesei	1.1
H0747199	Pia Larsson	Studies of enzymes and transport proteins with importance for harmful effects, diseases and disposition of xenobiotics in horse.	1.1
H0747211	Jonas Wensman	Proximity ligation assay for detection of Borna disease virus infections	1.1
H0847222	Carina Ingvast-Larsson	Intramuscular administration of sodium benzyl penicillin in horses - an alternative to benzyl penicilline procaine	1.1
H0947284	Anna Golovko	Characterization of the mechanisms predisposing to melanoma development in Grey horses	1.1
H0647164	Ulrika G Andersson	The prevalence of methicillin resistent Staphylococcus aureus in horses in Sweden	1.1
H0647122	John Pringle	Improved detection of upper airway problems in horses: Comparison of conventional /treadmill based videoendoscopy to recordings from a newly developed field based wireless in situ upper airway video camera.	1.1
H0747183	Anna Jansson	Can sodium and magnesium deprivation induce alterations in the cardiovascular system: are there any simple markers?	1.1
447034	Johan Bröjer	Decreased substrate availability of fat during recovery might be a liiting factor for glycogen resynthesis in muscle tissue in standardbred trotters	1.2
447045	Stina Ekman	Inflammatory markers in early equine osteoarthritis	1.2
H0547061	Stina Ekman	Biomarkers of inflammation and connective tissue meatbolism in the joint of intensily training horses	1.2
H0747209	Hans Pettersson	Oats, Trichothecenes. Effects and degradation by trotters.	1.2

H0847207	Maria Lönnberg	EPO MAIIA – A Novel, Sensitive and Rapid Test for Suspected rhEPO Doping of Horse including a Unique Affinity-Monolith Purification of EPO from Urine	1.2
H0847242	Johan Bröjer	Glucose and leucine as a potential aid in the resynthesis of muscle glycogen after streneous exercise in Standardbred trotters	1.2
H0647165	Jan Philipsson	Inherited defects in horse breeding - a review of the state of knowledge and a pilot study	2.1
H0547119	Heriberto Rodriguez-Martinez	Quality assessment of stallion semen för AI - Development of methods for handling and diagnostics	2.1
H0747189	Jane Morrell	Reactive Oxygen Species (ROS) in stallion semen; their origin, effect on spermatozoa and possibilities for control.	2.1
H0847216	Åsa Viklund	Genetic progress and strategies for selection based on integrated breeding values for Swedish Warmblood horses	2.1
447060	Åsa Viklund	Multitrait genetic evaluation of Swedish Warmblood Horses	2.1
H0747206	Johan Höglund	Epidemilocigal studies of Parascaris equorum in foals at Swedish stud farms with focus on the survival of Parascaris equorum eggs in different environments.	2.2
V0747002	Eva Osterman Lind	The occurence of Parascaris equorum in foals and in paddocks on studs with different management and the efficacy of different anthelmintics upon the shedding of eggs from P. equorum.	2.2
447026	Gunnar Lundin	Remoistening and Formation of Mould in Hay for Horses During Storage.	2.2
447053	Cecilia Müller	Interactions between difefrent forages and the equine large intestine regarding microbial constitution, biochemical activity and rate of passage	2.2
H0647120	Cecilia Müller	System analysis of baled silage in horse feeding - cut vs. long-stemmed forage	2.2
H0647173	Birgitta Essen-Gustavsson	Effects of different intake of protein in the diet on the concentration of glycogen and amino acids in muscle after a simulated trotting race	2.2
H0747173	Cecilia Müller	Wrapped forages for horses - influence of plant maturity stage at harvest on forage fermentation profile, hygienic quality, aerobic storage stability, equine eating time and on composition of equine faeces	2.2
447016	Anna Jansson	Feeding for health and performance	2.2
H0547072	Mari Zetterqvist Blokhuis	Develop methods to improve the rider´s seat and position and measure advantages for the rider and the horse	3.0
H0547117	Gunilla Silfverberg	The Horse As A Therapeutic Tool - About Therapeutic Riding, Wellbeing and Lifequality	3.0
H0547189	Niklas Adolfsson	Exposure to risk of accidents and high physical load at riding and trotting schools.	3.0
H0747192	Mari Zetterqvist Blokhuis	To test and implement methods to improve the rider´s seat and position on Swedish riding schools	3.0
H0747195	Ann Albihn	Salmonella contamination in paddocks - disease transmission to horses and environment	3.0
H0847240	Lena Elfman	The usage of 3D air dispersion models for calculation of the spread of horse allergen and odour around equestrian centres	3.0

***) Main research area:**

1) Equine health (1.1), performance and welfare (1.2)

2) Equine reproduction (2.1), breeding and feeding (2.2)

3) The role of the horse for humans, society and the environment. (3.0)

Appendix C contains a full list of the 113 projects that have been awarded grant funding over the period 2004 to 2011. This also shows the projects included in the assessment review, those that did not reply to the survey questionnaires and those that had not been completed at the time of the assessment (and therefore did not receive survey questionnaires). Table 2 below

summarises the focus of the projects awarded funding, the completed projects and the projects that were included in the assessment review (that submitted completed questionnaire forms). The projects have been categorised according to the assessment of the panel.

Table 2: Project and main research area

Main research area	**Project awarded funding**		**Completed project**		**Completed questionnaire form**	
1.1 Health	45	40 %	21	39%	18	41%
1.2 Performance and welfare	11	10%	6	11%	6	14%
2.1 Reproduction	12	11%	6	11%	5	12%
2.2 Breeding and feeding	14	12%	8	15%	8	19%
3 The role of the horse in society	31	27%	13	24%	6	14%
Total	**113**	**100%**	**54**	**100%**	**43**	**100%**

The table shows that the role of the horse for humans, society and the environment is not represented to any great extent in the questionnaire replies. Projects that concern performance, breeding and feeding are represented to a better extent. This weighting should be taken into account when considering conclusions about the distribution of projects over the main research areas.

4. Assessment of project quality

The quality of individual projects was assessed in relation to three categories: Scientific quality; Relevance and applicability to the industry, and Dissemination of information and communication.. The three primary categories were assessed individually. Each main category comprised a number of subcategories. The assessment score for each subcategory was combined to provide a final score for each main category. When the assessments were complete each project therefore had three final scores – one in each category.

In general, scores in the three categories were interrelated and, almost invariably, projects that scored highly for scientific quality also scored highly for relevance and communication.

4.1 Scientific quality

The following subcategories were included in scientific quality: research question and methods; scientific publications (articles); competence of the research group and the participation of young researchers. The panel assessed the general scientific quality to be high. There were 23 projects, which is just over half, that were awarded a score of 4 or higher. Six projects scored under 3.

Table 3: Scientific quality of the project (score 1 to 5)

Research area	No		Scientific basis	Methods	Competence	Articles	National /internat. collaboration	Young researchers	Overall score
All projects	43	Mean	4.2	4	4.3	3.7	3	2.9	**3.7**
		SD	0.7	0.7	0.8	1.2	1.2	1.4	**0.7**
Equine health	18	Mean	4.2	4.2	4.4	3.7	2.7	3.2	**3.9**
		SD	0.6	0.7	0.6	1.2	1.2	1.4	**0.6**
Equine performance and welfare	6	Mean	4.2	3.7	4.5	3.3	2.7	2.7	**3.5**
		SD	0.7	0.4	0.4	1.1	1.1	1.1	**0.7**
Equine reproduction	5	Mean	4.5	4.2	5	4.8	3.9	3.6	**4.4**
		SD	0.3	0.7	0	0.3	0.8	0.9	**0.5**
Horse breeding and feeding	8	Mean	3,1	3.7	4	3.7	3	3.1	**3.6**
		SD	0.9	0.8	0.7	1.2	1.1	1.3	**0.8**
Role of the horse for humans, society and the environment	6	Mean	3.7	3.9	3.3	2.6	2.6	2	**3.2**
		SD	0.4	0.5	1.2	1.2	1.7	1.4	**0.8**

Research question and methods

In general, the projects presented the research questions in a clear and concise manner. Hypotheses are clearly described and lie at the forefront of research. Some projects are more explorative in character and these naturally have less clearly defined hypotheses. There were

29 projects that scored 4 or over in this category and even projects with low overall scores for scientific quality often clearly presented the research question.

To be able to be performed well the projects must use suitable methods. The majority of projects also had good score ratings in this category. In certain instances the panel members have not been able to assess highly specialised methods and in these cases a peer review has been sought with regard to the description of the methods. In many instances the descriptions of the methods were clear and precise.

Some of the research, however, is not methodologically robust. For example, research has used too few research animals to be able to draw any conclusions (infection studies), or conclusions have been based on too little data or, in some cases, on an explorative study. None or very few of the projects include a reflection on the methodology and the robustness of the results. This is something that could have corrected methodological problems.

Even if such problems only affect a minority of the projects, it may nevertheless be of value for the research committee to particularly consider the research methodology in the processing of future applications.

Scientific publications from the project, competence of the research group, national and international collaboration

Scientific publication can sometimes be regarded to be of little importance in practice, but peer reviewed articles are no lesser a mark of quality of results and thus also of tangible importance.

There are major differences between projects when it comes to scientific publications. Some projects have yielded few publications, while many have performed well, not least with regard to the relatively small economic contribution from the SHF. It can however be difficult to compare lists of publications between projects, as many of the grants have been awarded as additional funding to larger projects that were already established. This can mean that a list of publications may appear to be comprehensive, but this is only to be expected if the original project was very large or if doctoral students have participated in the project.

The majority of projects encompass strong research groups. Projects lacking in this aspect were also often observed to have few scientific publications. Scientific publication could probably be augmented by ensuring that experienced researchers participate and that there is a good research environment for each and every project. For example, we found projects that were interesting and showed promise, but at the same time did not have a wide publication coverage and would have benefited from the participation of experienced researchers in the project.

It should be taken into consideration that publications are not relevant for all types of projects. Examples of these include screening studies/investigative studies to identify

research needs and pilot studies that break new ground. Both of these types of study can be of great value without being able to be published and are often difficult to fund under the auspices of research councils. For these reasons funding bodies such as the SHF should be open to such types of projects.

Research groups in general are highly competent. With the exception of a few cases, the projects involve the participation of experienced researchers and young scientists also participate in many of the projects. More than half of the projects, however, score poorly (< 3) in the national and international collaboration category. This aspect is commented on in section 5.3.

Young researchers

It is important to develop the research community by involving young researchers and Masters students in order to augment and renew the research environments that work with horse-related issues and, of course, in order to attract young researchers to work with horses. In terms of the involvement of young researchers there is wide variation between the projects. Some of the projects (13) are exceptional, while a second group of projects (15 projects) score very poorly. This should be an aspect that the research committee should pay additional attention to in the future.

Conclusions and recommendations

In general the panel found the scientific quality of the projects to be of a very high standard, focusing on scientifically well-argued research questions. The majority of projects also performed well with regard to methods, publications, involvement of young researchers, and international co-operation, but the variation is wide, and a minority of projects were found to have problems in some of these categories.

The panel recommends that the SHF research committee pays particular attention to the robustness of the methods proposed in the applications. If possible, it should be requested that the final reports contain a reflection of the robustness of the methods used.

In the scientific publication category there is also a wide degree of variation. The panel suggests strengthening continuity and thus publication by ensuring that senior researchers are represented in every project. This could even be a condition for granting an otherwise high quality application submitted by a young researcher. On the other hand, attention should also be given to the renewal of the research environment by the inclusion of young researchers in the projects.

The panel was pleased to see that SHF has not only awarded grants to 'safe' projects, but also to 'risky' projects, where results and publication may be uncertain, but which may have the potential to break new ground or test new methods Such projects are important as incubators (when well performed), and, SHF should continue to be open to such projects.

4.2 Relevance and application

Relevance and applicability of the research has been viewed as very important by the panel, because the research is funded partly by financial contributions from the equine industry. Relevance and applicability is assessed in terms of the importance of the research question in relation to horses and the equine industry; assessment of the possible influence of the results on the equine industry; and assessment of the possible influence on the welfare of the horse. Although in many cases the interests of the industry and those of horse welfare coincide, there may also be instances where these aspects conflict, and because of this the panel wanted to assess these categories separately.

Table 4: Relevance of the project for the industry (score 1 to 5)

Research area	No.		Important question	Benefit	Knowledge	Implementation	Overall assessment
All projects	43	Mean	4.2	3.7	3.6	2.5	**3.7**
		SD	0.8	0.8	1	0.1	**0.8**
Equine health	18	Mean	3.8	3.3	3.4	2.8	**3.4**
		SD	0.8	0.8	0.8	1.1	**0.8**
Equine performance and welfare	6	Mean	4.5	3.9	3.6	2.7	**3.7**
		SD	0.6	0.6	0.5	1	**0.4**
Equine reproduction	5	Mean	4.3	4	3.5	3.6	**3.9**
		SD	0.8	0.9	1.1	0.6	**0.8**
Horse breeding and feeding	8	Mean	4.4	3.9	4	3.5	**4**
		SD	0.8	0.9	1	0.8	**0.8**
Role of the horse for humans, society and the environment	6	Mean	4.2	3.3	3.6	3	**3.5**
		SD	0.5	0.8	1.6	0.8	**0.6**

Is the research question important to the economics of the equine industry and to the welfare of the horse?

The research questions addressed were in general assessed to be important ones. Twenty-eight (65%) of the projects were assessed as very good or even excellent (highest score) in relation to the importance of the research questions. In this category there were only two projects (4.7%) that were awarded a below average score by the panel. The majority of projects therefore scored highly in this category, and often the scores were very high. It should be noted that the panel has taken a relatively broad view on the definition of important and that both very specific veterinary medicine projects and projects that concern husbandry and training have been assessed to be important.

Certain issues of importance to the industry that could be just as relevant are not covered by research. Issues such as environmental effects, economics within the area and behavioural studies are not addressed at al. It is not obvious if the paucity of projects within these relevant areas is due to intentional SHF decisions or if there are other reasons for this, such as lack of applications for funding within these areas.

Are the results of use to the equine industry?

The assessment of the panel was that the majority of projects are useful to the industry.

The usability of the results can be difficult to assess. This is because some projects yield results that can be used immediately while others yield results that can be used in the future. This applies for example to new insights that must be conveyed via the education of the user or results that form the background for the development of potentially new equine medications.

The variation in the project evaluations (score 1 to 5) may partly reflect the differences between the different project types, such as between basic and more applied research, where applied research projects may have received a higher score. We find it very positive that SHF supports and recognizes the importance of both basic and applied research projects.

It may be difficult to obtain funding from other sources for applied research that concerns specific animal species and supporting such projects is therefore an obvious task for the SHF. It may also be difficult to obtain funding for basic research on an individual species, such as the horse, from sources such as research councils, and this research should also be supported by the SHF.. Nevertheless, each project should be assessed to determine if it has a wider perspective and supports a good research environment in order to achieve results that are of use to the equine industry.

Are the results useful for the welfare of the horse?

This question was added by the panel after the questionnaire survey had been sent out to the project grant recipients. This point was therefore not addressed separately in the questionnaires but was included in the question "Are the research results useful for the equine industry/horse welfare". Although the welfare perspective was therefore often only described indirectly, many of the projects scored relatively highly in this assessment category. In principle there were no projects with the welfare of the horse as a central focus topic.

It is the opinion of the assessment panel that the welfare of the horse is important to both the equine industry and society as a whole. Therefore more projects should be funded that directly address the welfare of the horse, such as improving and understanding aspects of stabling or caring for and training horses, all of which are hot topics in Scandinavia and indeed in the world over. The impact of the project on the welfare of the horse – from the perspective of the horse – should be addressed in the grant application, even if the main focus of the project lies elsewhere, as topics such as performance targets in improving the performance of the horse can sometimes be viewed as a threat to the welfare of the horse. This problem is of general interest and is important for the reputation of equestrianism and therefore is also of interest for the SHF.

Application/implementation of results

The average score for all projects was slightly less than 3 (Satisfactory project). This should not be only interpreted as negative, as projects taking risks or breaking new ground may be important, but may also have a low immediate implementation value for the industry. Three projects (7.0%) were judged to be very weak in terms of application/implementation value (score 1)

Even if implementation is considered to be a positive aspect of a project, it is important to consider that in some cases it is not within the power of the researcher to ensure that the results and knowledge obtained are implemented in practice. For example, results could lead to changes in legislation, inclusion in a university text book, changes in training of veterinarians or other horse-care professionals, or changes to breeding models. Sometimes the knowledge acquired may only be implemented in the general management of horses, which is hard to measure and is not in the hands of the scientists producing the knowledge. Communication and dissemination of information are however important aspects in the spreading knowledge and in the long run also for implementation, not least via the introduction of the knowledge into the education of those caring for horses. In the projects assessed the collaborations between researchers and, for example, breeding associations are also good examples of how it is possible to ensure that the results obtained are implemented, if they are useful.

We recommend that project applications describe a few ideas about how the results can be disseminated to target groups in order to be implemented.

In general the SHF appears to be willing to take some risks and support both projects with low and high immediate application potential. For SHF it may be important to consider that not all projects produce results that should or can be implemented. These may be basic research projects or investigative projects that are high risk – still these projects may have high value to the horse industry in the longer perspective although immediate implementation value is low

Conclusions and recommendations

SHF has funded both basic and applied research projects, generally of a very high relevance and high value to the equine industry.

The panel as observed a lack of projects of relevance to the equine industry within certain topics, including studies concerning stabling, care and training in relation to the welfare of the horse. The panel recommends that the reasons for the absence of certain research topics should be considered.

The panel recommends that the impact of the results on horse welfare should be addressed in each application, even for projects performed for other reasons, such as improving performance or better economics.

It is the view of the panel that project applicants should have put more effort into presenting their thoughts on how their results could be disseminated to reach the target group and be implemented. This would improve some of the otherwise valuable research projects. This aside, we believe it is positive that the SHF has supported not only low-risk projects that can be easily implemented in the short term, but also projects that have the potential to be valuable for the equine industry in the long term.

4.3 Dissemination of information

It is very important that the research results are communicated to users/consumers in the equine industry, to be able to be utilised in practice.

Table 5: Information/communication of research results (score 1 to 5)

Research area			Verbal	Written	Educational	International	Overall assessment
All projects	43	Mean	3.5	3.2	3.4	3.3	**3.5**
		SD	1.2	1.2	1.3	1.3	**1**
Equine health	18	Mean	3.3	3.2	3.4	3.3	**3.5**
		SD	1.1	1.2	1.1	1.2	**0.9**
Equine performance and welfare	6	Mean	2.4	2.2	2.2	2.5	**2.6**
		SD	1.1	0.4	1.3	1.7	**0.7**
Equine reproduction	5	Mean	4.2	3.8	4.3	4.9	**4.2**
		SD	1.1	0.9	1.3	0.2	**0.9**
Horse breeding and feeding	8	Mean	3.6	3.8	3.7	3.4	**3.7**
		SD	1.3	1.3	1.4	1.4	**1.2**
Role of the horse for humans, society and the environment	6	Mean	4	3.2	3.7	2.2	**3.6**
		SD	1.1	1.4	1.5	1	**1.1**

National and Nordic dissemination of results to the equine industry and horse owners: verbally and in writing

There is a wide variation between projects in terms of the communication of results. Some projects have shown exemplary reporting to the industry while other projects have been extremely lacking in this area. It must be taken into account that certain research is not of such great interest to the user, but such results should be reported using other appropriate media channels, such as in veterinary journals. This has not always been the case.

There is a positive correlation between good scientific quality of the projects and good communication of the results to the industry. The research area that has in general had the worst communication of results is 'Equine health, performance and welfare'. It can also be concluded that there is a trend towards the oral presentation of results being prioritised when

compared to written communication, which can have both advantages and disadvantages. The advantages include the fact that verbal communication is direct and engaging, but the disadvantages include the fact that the information is cursory. It is therefore important to prioritise both types.

Is the research and its results used in the education of equine industry professionals and in the education of young researchers?

An important channel for the spread and implementation of research results is that these are used and presented in lectures. The effects of this are both great and long-standing. The research results are used in teaching, but to varying degrees. For certain projects this happens as a matter of course and to a large extent. Almost half of the projects (19) scored highly or very highly, while 14 projects scored very poorly.

Some research projects have to a great extent involved both students and young researchers in the projects. Others have lacked this aspect entirely, although this should have been possible.

One recommendation is that the SHF decides that this becomes a part of the evaluation criteria for funding and that, even if this is not relevant for all projects, the committee directs attention to this issue.

International dissemination and communication of the results

The majority of projects are published and communicated internationally in some manner. Publication and communication has however been performed to varying degrees and the number of publications varies, which is partly explained by the scientific level of the work and the traditions at the departments where the research has been performed. Some of the projects that scored very highly for international publications appear to be projects that have only been funded to a lesser extent by the SHF. International collaborations have generally been weak, but this may partly be explained by the equine research area being relatively small and that at certain departments there is broad international affirmation through visiting researchers, for example, and extensive specialist knowledge of the subject area. It would be desirable to have more projects that actively seek to expand and establish collaborations both within the Nordic countries and internationally, as well as over animal species boundaries if this is possible. There are projects for which this would have been possible but in which these opportunities were not exploited.

Conclusions and recommendations

There is not really any Nordic forum for the specific promotion of equine research and there are also relatively few researchers in the Nordic countries specifically performing exclusively equine research. This may be a natural explanation for why there are shortfalls in the

dissemination of Nordic research results. One of the cornerstones of successful and durable Nordic equine research is involving students and researchers at different levels in the research project.

One conclusion that can be drawn is that the departments that are accustomed to performing good research projects have greater opportunities to perform good research that is communicated and implemented well.

When grant applications are evaluated, particular attention should be paid to whether the project has a plan for; involving students and young researchers at different levels, communicating the results to the industry and internationally, collaborating within the Nordic countries, internationally and over species boundaries, as well as integrating research results into teaching.

5. Assessment of projects in relation to SHF main funding areas

5.1 Are the main SHF strategy areas covered by the projects?

The SHF research programme is divided into three main areas. These three areas are not covered to equal extents by the research projects that were included in this assessment review.

- Equine health, performance and welfare: a group of 24 projects, of which 18 concern health and are closely associated with the performance of the horse.
- Equine reproduction, breeding and feeding: 13 projects, of which 5 directly address reproduction while 7 concern stabling and feeding management.
- The role of the horse for humans, society and the environment: 6 projects in total, where three address the horse as a 'prerequisite for sport/recreation', although they also touch on the welfare of the horse. Only two projects directly address environmental issues.

Almost all 43 projects can be seen to include certain aspects that impact the welfare of the horse, but this is not always clearly described in each project. Taking into account all projects granted funding since 2004 there are a higher proportion of projects that address the role of the horse in society and that have their origins in the social sciences.

Almost half of the projects concern solely health, and these have a strictly veterinary medicine perspective. The topics covered are in general relevant and it must be emphasised that veterinary diagnoses and treatments are major financial burdens for horse owners and are very important to the welfare of the horse. To be able to determine a diagnosis at an early stage, initiate appropriate treatment and prevent disease and health problems an understanding of the mechanisms underlying the health of the horse are essential and the projects fulfil this to a large extent. In most cases the projects are also performed in a very good manner. Some of the projects are however very specific and the panel regarded some of these to be of little relevance to horses in Sweden. In one case, the project lies very close to the threshold of being more appropriately funded by the pharmaceutical industry. If such projects are to receive grants, some type of royalty payment in the event of commercial success should be considered.

Research concerning roughage and feeding has been very successful with generally short time periods between results and implementation.

Although the research is generally assessed to be relevant, the panel still finds that a number of essential topics are absent. Topics that the panel would particularly like to see better coverage of are:

- Equine welfare with a focus on the everyday life of the horse: care, behaviour, stress biology, handling and training methods.
- Preventive health studies, including care, feeding etc.
- Environmental studies that focus, for example, on the management of manure etc.
- Economics, which is a major problem for the equine industry: projects that deal with cost benefits, economics within the industry, new business avenues and welfare economics.

Social sciences and the humanities are lacking in the projects assessed. Even if the proportion is higher when the entire portfolio from 2004 to 2011 is taken into consideration, these could have been included to a greater extent.

There is great variation in project type, from very small pilot projects to very large projects that are partially funded by the SHF. The assessment panel would like to emphasise that the breadth of project portfolio contains a varied range of high quality projects. The panel would also like to express its satisfaction that certain research themes have been followed up in a number of subsequent projects. For some of these the quality has been raised in the follow-up projects. There have also been a number of 'brave' – or unusual – awards, for example to projects concerning the rider's seat, which have involved innovative methods and interesting results.

5.2 Which disciplines have contributed?

Several disciplines have contributed to the research projects, including clinical veterinary research, genetics, breeding, physiology, epidemiology, microbiology, nutrition and social sciences. The scientific disciplines of ethology (animal behaviour), environmental impact and economics are practically absent from the projects granted funding.

In some cases projects with horses are performed at research facilities by research teams working with several animal species. The links between disciplines and the references to studies in other animal species could however be greater in some projects and enable benefits to be gained from synergistic effects. In some cases it may be advantageous to consider horses as an integrated part of animal science, for example, as certain mechanisms/ problems are shared between laboratory and production species. One example is the free-stall self-selection system, which has become more and more widespread in cattle farming.

5.3 Nordic/international collaboration

In general the scoring for Nordic/international collaboration was very low compared to the other assessment criteria. Differences can be seen however between the different research areas. The projects concerning the health of the horse 'Hästhälsa' and the horse in society

'Hästar och samhället' received the lowest scores, while the reproduction projects 'Hästar och reproduktion' scored highest in this category.

For some of the projects Nordic/international collaboration is not so relevant and it may be difficult to find relevant collaborative partners in other countries. This may be a contributory factor to the low scores. For other projects there are obvious relevant collaborative partners in the other Nordic countries.

In general the projects have better national collaborations than Nordic/international collaborations. It could be argued that as the SHF wants to establish Nordic equine research as world-leading then it would be appropriate for researchers to also be participating members of the international research community. The research projects demonstrate good international publications and some have actively participated in international conferences, but direct international collaborations are not satisfactory.

6. Conclusions and recommendations

6.1 Nordic equine research – world-leading?

The SHF has the overall goal of making Nordic equine research a world leader. The panel regards the ambition to be 'world-leading' to be visionary and has been impressed by the collaboration within equine research that has been established to date between Sweden and Norway, not least due to the considerable funding contributions from the equine industry.

Nordic equine research has high ambitions — to be world-leading. However, the Nordic countries are small and there are only a small number of scientists working the area of equine science. The panel is therefore positively disposed to the concept of pooling research funding, not only between Sweden and Norway, but among the Nordic countries in general. The equine industry in the Nordic countries faces the same types of challenges. Better collaboration among the Nordic countries can give rise to larger projects and therefore greater visibility and continuity in the research work. A common platform for Nordic equine research would be a good forum to facilitate applications for EU-grants for equine-related research projects. This may be one way to realise the ambitious goal.

To achieve this goal the panel recommends that the SHF invite representatives from the equine industry in the Nordic countries to a meeting to discuss further collaboration as to how the vision 'world-leading' can be achieved.

6.2 The quality of the funded research

A fundamental factor for world-leading research is high quality. In general the panel found the research funded to be of high scientific quality, high relevance and in most cases also well disseminated.

Problems were observed in a small number of projects and the recommendation of the panel is therefore that the committee pay specific attention to the following themes in applications:

- Robust methodology
- Involvement of both experienced and young researchers in the research team
- Description of a plan for the dissemination of information in order to improve the possibilities of implementation, for example the spread of result information via the education of professional disciplines, and
- Nordic and international collaboration

6.3 The role of the SHF as a funding body

The SHF has a specific role as a funding body: the foundation has a very specific focus – horses – but this theme can be tackled by a number of different scientific disciplines and using a variety of methods. Veterinary medicine projects comprise by far the largest group of projects funded and these also scored highly in the scientific quality and publication categories. For some of the projects the funding contributed by the SHF forms only a minor part of the total funding for the project. Additional grant funding for an ongoing project can be an efficient way to utilise resources. Nevertheless it is the opinion of the panel that it could be advisable in the future to fund some projects of significant magnitude that would be the SHF's 'own' projects. Interdisciplinary projects in which a 'problem' is tackled from different angles should be encouraged, to ensure, for example, that both treatment and prevention solutions are developed.

As the financing administered by the SHF is partially derived from private sources (the equine industry) a high degree of application and relevance to the equine industry is expected. In addition it is difficult to attract funding from other sources for applied research that is focussed on a specific branch. The panel recommends that the SHF maintains a high emphasis on utilisation, relevance and implementation, but also continues to provide scope for more basic research-based and explorative projects, both of which may have high potential for future utilisation.

6.4 Coverage of the SHF strategy and research programme

The SHF strategy and research programme has remained fairly unchanged over the seven years that the foundation has been in existence. The research projects that have been assessed by the panel are very unevenly distributed with regard to the main strategy and programme areas. Health is the primary focus area of the projects (and in particular diagnostics and medical treatment), while the role of the horse in society has a significantly lesser focus. The same pattern of predominance was observed over all projects funded between 2004 and 2011. Diagnoses and treatments are very important for the equine industry and the welfare of the horse. On the other hand other obvious research fields are not covered to the same extent, and some are not covered at all. It is therefore the recommendation of the panel that the strategy, programme and application guidelines, as well as the processing by the committee, takes into account that projects should cover a broader research field – or that the SHF clearly defines its priorities.

Some of the fields that the panel was surprised to find had been omitted were, for example, equine industry economics, environmental issues, and behavioural studies related to equine husbandry and training. In conclusion the panel would like to advise that each application should state the potential impact of the research on the welfare of the horse, even if this does not form part of the immediate framework of the project.

7. Good examples

Important research with good dissemination of information:
***Genetic mapping of candidate genes that regulate the occurrence of summer eczema in horses*, Gabriella Lindgren, SLU**
A project for which there is a pressing need, both for horses with summer eczema and their owners, as the occurrence of this problem is associated with great suffering for the horse and an intensive amount of extra work for the horse owner. The project has been well performed in a strong research environment, with merited scientists and students of differing educational levels involved and has included both a quantitative genetics and molecular genetics focus. The project has also, in a highly exemplary way, collaborated with those directly affected by the problem - the Swedish Island pony association, SIF. The results have been communicated well, both to the owners of Island ponies at general meetings of the horse community in Sweden and in an international context. It is also satisfactory that the results of this research project have given rise to several continuation studies and more extensive international collaborations.

Excellent publication and dissemination:
***Reactive oxygen species in stallion semen.* Jane Morell, SLU.**
This is an example of a relevant smaller project that has performed excellent work in the area of publication and communication. The project, which has been partially funded by the SHF, has generated eight articles in scientific journals that employ a peer-review system, together with other forms of communication and invitations to give lectures. The results have therefore been communicated to a wide target group, including scientists and people who work with horses. This project also provides an example of an excellent level of active international collaboration, which is an area that has otherwise been found to be a weak point in some of the assessed SHF-funded projects.

Explorative and thought-provoking research:
***Genetically determined defects in the horse breeding - a knowledge orientation and pilot study.* Jan Philipsson, SLU.**
Genetic defects are an international animal welfare problem that can have major financial consequences for the horse owner. A questionnaire survey that encompassed several of the major horse breeding associations in Europe highlighted the problem internationally in different forums and in reports. This has resulted in raising awareness about whether there should be a common international policy and reporting of genetic defects. The questionnaire survey has provided improved knowledge of the prevalence of health disorders, heritability and their importance to the welfare of the horse and sustainability, as well as information

about how this issue is dealt with in different countries. This project is a very good example of how knowledge gaps can be highlighted in a simple way and how awareness can be drawn to common international problems that have not previously attracted the attention that they merit.

Practical results for horse owners:

Effects on fermentation, aerobic storage stability under aerobic conditions, horses feeding time and faecal composition **Cecilia Müller, SLU.**

Wrapped haylage/ensilage fodder used for horses is often long-stemmed bulk feed, despite other silage feeding systems having demonstrated that cutting or chopping of the stems prior to silage processing produces a greater and/or more rapid production of lactic acid and longer aerobic storage stability. A study was therefore performed to compare the long-term sustainability and feeding of chopped and long-stemmed bulk fodder such as bales of ensilage. This study demonstrated that chopped haylage is not a superior feed for horses and that there is therefore no reason to chop long-stemmed bulk fodder before silage processing. The results are of great interest to those who perform practical work with horses, as money can be saved by not chopping bulk feed.

Good collaboration between research and practice:

Breeding Progress and selection strategies based on the integrated breeding index for Swedish riding horses and integrated breeding index for national genetic evaluation of Swedish riding horses. **Åsa Viklund, SLU.**

Breeding evaluations are dependent on the information gathered from breeders or riders and their organisations. It is therefore natural that research within this area is performed in collaboration with breeding organisations, as it is these organisations that implement the results obtained. These two projects are good examples of how a close collaboration been the end user and a strong research team can lead to results that are of great value to both science and the industry. The results have been presented and published both nationally and internationally, in writing and orally. The projects are good examples of how it is possible to disseminate scientific results on several levels.

Excellent science, relevance and dissemination:

Melanoma of grey horses**. Anna Golovko, Uppsala university.**

The gene that results in grey pigmentation banding of the hair strand gives rise to the white colouration that is characteristic of most Lippizana and Arab horses, as well as being common to may other breeds. But a large majority of the horses (80%) who bear this gene develop melanoma, a type of tumour, as they grow older.

Using a sequential strategy, where each successive stage of the project was dependant on the results of the previous stage, the project was able to generate new and interesting knowledge

about melanoma in grey horses. The project has found that it is the same mutation that gives rise to the grey pigmentation that causes the development of melanoma. This new knowledge of the underlying cellular/molecular mechanism is key to developing future treatments and vaccinations. Both in vitro and in vivo (model) studies have been used. The project has published articles in highly ranked scientific journals. Despite molecular genetics being a difficult area to communicate to the general public, this project has succeeded in doing this excellently.

This is an example of exciting basic research that has been performed methodically. The topic has practical relevance, is of major interest and has been communicated to the general public despite being a highly specialised discipline (molecular genetics).

Interdiciplinary research and intervention:
***Air quality in stables: a broad scientific approach*, Lena Elfman, SLU.**
The project addresses a well-known problem: the poor quality of air in stables, which can impact both horses and people. A large number of air quality parameters were measured both indoors and outdoors, including dust, gases, microorganisms and horse allergens. The airways of the horses were examined clinically by endoscopy. Blood tests were performed and airway/lung samples were analysed cytologically for signs of inflammation. Following this, mechanical fans were installed to improve stabling conditions and the quality of the air was examined again after a certain time period.

Despite the many challenges encountered when using commercial facilities (i.e. difficulties in being able to control certain factors), the project was able to show positive effects from this simple intervention. An example of a broad approach to tackling problem conditions (in this case the environment in the stable).

Innovative, explorative project:

Develop methods to improve the rider's seat by suitable exercises, while reducing the risk of physical and mental health of the horse. **Mari Zetterqvist Blokhuis, MZ Equine Pedagogic.**

This project addresses the rider's seat and how this impacts the enjoyment of the horse and rider. In one project evaluations were made with the help of experts, which were then coupled to the heart rhythms of the horse and rider. The investigations were repeated after a period of training of the riders. A second project focussed solely on the enjoyment of the riders before and after the specified training.

The project is based on the seat problems of amateur riders. These problems are very common among recreational riders and affect many horses. The project addresses both the level of enjoyment of the average rider gets from their horse and also – in all likelihood – a significant welfare problem for horses.

This is an area in which very little research has been carried out to date. The project is therefore explorative: the descriptions of the techniques and hypotheses are not particularly exact and the methods used are innovative but are more or less 'home-crafted' and the results are hardly conclusive. The value of the project lies in the focus on a seldom explored area, innovative methods and an extremely industrious dissemination of information despite a very small budget.

8. Appendices

Appendix A: Assessment of projects funded by the the Swedish-Norwegian Foundation for Equine Research (SHF) 2004 – 2011

Questions to be answered by the main applicant for each individual project. Use Times New Roman, font size 12. Do not make changes to the pre-printed text. Please reply no later than 1st December 2011.

Respondent (name and E-mail):

1) Summary of the project and its results

a) **Project number**	
b) **Project title**	
c) **Main applicant** (title, name and organisation)	
d) **Other project participants** (title, name and organisation)	
e) **Other collaborators** (organisations/companies)	
f) **Project duration** (year of initiation and completion)	
g) **Primary nature of the project**: Applied research, Development effort, Research activity *or* Information/education/ advisory (please select only ***one*** alternative)	
h) **Main focus area of the project** 1) Equine health, performance and welfare, 2) Equine reproduction, breeding and feeding *or* 3) The role of the horse for humans , society and the environment (please select only ***one***	

alternative)	

i) **Brief summary of the project**

j) **Brief summary of the most important scientific findings**

k) **Brief summary of the short and long-term practical benefits of the results.**

2) Funding

a) Type of funding (Pilot project, Partial funding *or* Complete funding)	
b) Total funding from the SHF	
c) Total funding from other external sources	
d) Own funding (e.g. provided by the department)	
e) Total funding over all years	
f) State if this has been a 1, 2, or 3-year project	

3) Scientific activities within the project

a) **Scientific publications** (Include only articles where the majority (>50 %) of results derive from the current project). Articles are documented below in three categories:

1) Published articles in scientific journals that operate a policy of peer review

	Article (authors, publication year, article title, complete name of journal, volume number, issue number, page numbers)
1	
2	
etc.	

2) Manuscripts intended for publication in scientific journals that operate a policy of peer review

	Article title	Authors	Intended journal	Status*
1				
2				
etc.				

*) State one of the following alternatives; not submitted/submitted/under review/accepted

3) Other scientific publication

b) **Oral presentations at international scientific conferences**

	Conference tile	Place, date, organiser	Number of participants	Title of the presentation	Presentation status*
1					
2					
etc.					

*) State one of the following alternatives; poster/session/plenary/invited (key-note speaker)

c) **International collaboration within the project**

	Swedish project participants	Foreign partners	Nature and objectives of the collaboration	Volume of activities for Swedish participants (weeks)
1				
2				

etc.				

d) **Nordic scientific collaborations within the project** (state particularly whether the collaboration was within the framework of the SHF collaboration with Norway)

	Swedish project participants	Nordic partners	Nature and objectives of the collaboration	Volume of activities for Swedish participants (weeks)
1				
2				
etc.				

e) **National scientific collaboration within the project**

	Swedish project participants	National partners	Nature and objectives of the collaboration	Volume of activities for Swedish participants (weeks)
1				
2				
etc.				

f) **Contribution of the project to university education**

Lectures/practical work (state subject, target group and scope)	
Project work within first-cycle education (name of student, examination year and title of the dissertation)	
Master's/Doctoral degree obtained with substantial funding from the current project (name of the graduate, year of examination and title of the thesis)	

4) Relevance for the industry

a) **Project results and relevance for the equine indstry** (max ½ A4-page)

b) **Communication and interested parties**

5) Popular scientific communication of results

a) **Presentation at conference/seminar/workshop**

	Title of the presentation	Organiser	Target group	Number of participants
1				
2				
etc.				

b) **Presentations on courses or similar**

	Title of the presentation	Organiser	Target group	Number of participants
1				
2				
etc.				

c) **Presentation at exhibitions/study visits/study trips**

	Title of the presentation	Organiser	Target group	Number of participants
1				
2				
etc.				

d) **Written reports** (articles, conference reports, completed manuscripts etc.)

	Authors, publication year, article title, complete name of journal, volume number, issue number, page numbers
1	
2	
etc.	

e) **Information on websites/own homepage/other homepages**

f) **Other communication of research results** (reference group or other arranged dialogue with the industry, radio, TV, internet etc.)

Thank you for your participation! Please send the form to viktoria.halltell@formas.se

Appendix B Assessment form for individual projects

Brief instructions:

- Each question is answered by providing a score rating (0 to 5) and a brief comment.
- An overall assessment of the scientific quality, relevance for the industry and the dissemination of information/communication is then given a score rating (0 to 5) and a slightly more expansive comment on the strengths and weaknesses of the project.

Please remember to take into consideration:

- Project duration (1, 2 or 3 years)
- When the project was completed
- How much funding the project received
- The primary nature of the project (Applied research, Development effort, Research study or Information/education/advisory)

Points scale for questions and general assessment:

Points	**Questions – explanation of points scoring**	**General assessment – explanation of points scoring**
0	The question cannot be answered	A general assessment cannot be made
1	No, absolutely not	Completely unsatisfactory project
2	No, only to a lesser extent	Somewhat inadequate project
3	Yes, to the extent that can be expected	Sufficiently satisfactory project
4	Yes, exceeds expectations	Very good project
5	Yes, exceptionally well	Excellent project

Information about the project:

Project number:	
Project title:	
Main applicant:	

Assessor:

Scientific quality of the project:

Question addressed	**Points (0-5)**	**Brief comments**
Has the research been scientifically well motivated?		
Has the research used appropriate methods?		
Has the project been led by academically well qualified individuals?		
Has scientific production in the form of international peer-reviewed articles, as well as other scientific publication been quantitatively and qualitatively satisfactory?		
Has the research utilised opportunities for national and international collaboration?		
Has the research contributed to academic renewal by involving students of different levels (MSc, Master's students, Doctoral students?)		

Overall assessment of scientific quality:

Points (0-5)	**Strengths**	**Weaknesses**

Relevance of the project for the industry:

Question addressed	Points (0-5)	Brief comments
Has the research concerned important and current issues for the Swedish and Nordic equine industry/welfare of the horse?		
Has the research arrived at new, important and useful knowledge that contributes to improved benefit/value for the equine industry?		
Has the research arrived at new, important and useful knowledge that contributes to improved equine welfare?		
Implementation: Has the research contributed to the development of the equine industry/welfare of the horse?		

Overall assessment of relevance for the industry:

Points (0-5)	Strengths	Weaknesses

Information/communication of research results:

Question addressed	Points (0-5)	Brief comments
Has the research been communicated to users at conferences/courses/exhibitions etc. in a satisfactory manner?		
Has the research been communicated in written format to users in a satisfactory manner?		
Has the research been communicated in an educational context?		
Has the research been sufficiently visible internationally?		

Overall assessment of information/communication of the research results:

Score (0-5)	Strengths	Weaknesses

Appendix C Swedish-Norwegian Foundation for Equine Research – projects funded 2004 - 2011

Projects highlighted in green: These have received and responded to the questionnaire.
Projects highlighted in red: These have received the questionnaire but have not responded.
Projects not highlighted: These have not received the questionnaire (i.e. they do not fall within the criteria of the assessment).

Project no.	Project	Project manager(s)	Year	Main investigator(s)	Location
	Training strategies, surface usage, days lost and locomotor injuries in show-jumping horses	Agneta Egenvall	2011	Egenvall, Agneta	
H0547136	Development of a quickly performed diagnostic test in the field for identification of an inflammatory state in horse	Anki Koch-Schmidt	2006, 2007, 2008	Koch-Schmidt, Anki	Kalmar University College
H0747195	Salmonella contamination in paddocks - disease transmission to horses and environment	Ann Albihn	2008	Albihn, Ann	SVA
	Salmonella contamination in paddocks	Ann Albihn	2009, 2010	Albihn, Ann	
	Rehabilitation and evaluation of pain in horses	Anna Bergh	2007	Bergh, Anna	
H0947284	Characterization of the mechanisms predisposing to melanoma development in Grey horses	Anna Golovko	2010, 2011	Golovko, Anna	UU, Uppsala University
447016	Feeding for health and performance	Anna Jansson	2005, 2006, 2007	Jansson, Anna	SLU
H0747183	Can sodium and magnesium deprivation induce alterations in the cardiovascular system: are there any simple markers?	Anna Jansson	2008, 2009	Jansson, Anna	SLU
	Bridleways, a part of Multifunctional greenways as tools for strategic landscape planning – proposals for design & implementation in peri-urban landscapes	Anna Peterson	2008	Peterson, Anna	
	The 13C-bicarbonate techique - a non-invasive, rapid and simple method for correct estimates of energy expenditure in horses	Anne-Helene Tauson	2011	Tauson, Anne-Helene	
	High quality silage for horses giving more profit and improved animal health	Astrid Johansen	2010, 2011	Johansen, Astrid	
447057	Studies of Streptococcus equi with the aim of developing methods to prevent strangles	Bengt Guss	2005, 2007	Guss, Bengt	SLU
	Molecular biology studies of horse pathogenic streptococci to gain increased knowledge of the disease strangles	Bengt Guss	2008, 2009, 2010	Guss, Bengt	
	Studies of extracellular proteins in Streptococcus equi and Streptococcus zooepidemicus for increased knowledge about streptococcal infections in horse.	Bengt Guss	2011	Guss, Bengt	

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H0647173	Effects of different intake of protein in the diet on the concentration of glycogen and amino acids in muscle after a simulated trotting race	Birgitta Essén-Gustavsson	2007	Essén-Gustavsson, Birgitta	SLU
	Muscle properties of young standardbred trotters and relation to performance capacity as a racehorse	Birgitta Essén-Gustavsson	2008	Essén-Gustavsson, Birgitta	
447038	Basic pharmacokinetic and pharmacodynamic studies of antihistamines in the horse	Carina Ingvast-Larsson	2005	Ingvast-Larsson, Carina	SLU
H0547030	Clinical Evaluation of Antihistamine to Horses with Sweet Itch	Carina Ingvast-Larsson	2006	Ingvast-Larsson, Carina	SLU
H0847222	Intramuscular administration of sodium benzyl penicillin in horses - an alternative to benzyl penicilline procaine	Carina Ingvast-Larsson	2009, 2010	Ingvast-Larsson, Carina	SLU
	Glucocorticoids in horses - safe usage in a doping and medication perspective	Carina Ingvast-Larsson	2011	Ingvast-Larsson, Carina	
H0547166	The horse - a nature preservationist or marauder?	Carina Palmgren Karlsson	2006	Palmgren Karlsson, Carina	SLU
H0747214	The horse as a nature preservationist	Carina Palmgren Karlsson	2008	Palmgren Karlsson, Carina	SLU
	How do adolescent female riders perceive the appearance culture within the horse barn environment?	Carolina Lunde	2010, 2011	Lunde, Carolina	
	Keeping of Horses in the Urban-Rural Fringe-Environment and Attitudes Part 1. Attitudes towards Horsekeeping - Odour, Allergenes, and oother Disturbances	Catharina Svala	2005	Svala, Catharina	
447053	Interactions between difefrent forages and the equine large intestine regarding microbial constitution, biochemical activity and rate of passage	Cecilia Müller	2005	Müller, Cecilia	SLU
H0647120	System analysis of baled silage in horse feeding - cut vs. long-stemmed forage	Cecilia Müller	2007	Müller, Cecilia	SLU
H0747173	Wrapped forages for horses - influence of plant maturity stage at harvest on forage fermentation profile, hygienic quality, aerobic storage stability, equine eating time and on composition of equine faeces	Cecilia Müller	2008, 2009	Müller, Cecilia	SLU
	Fungal flora and presence of mycotoxins in wrapped forages for horses	Cecilia Müller	2011	Müller, Cecilia	
	Vidareutveckling av avelsarbete på kallblodstravaren (No English translation available)	Christina Olsson	2006, 2007	Olsson, Christina	
	Evidence based medicine: Objective determination of lameness	Christopher Johnston	2009	Johnston, Christopher	
447059	How to evaluate foreign bloodstock and its importance for Swedish Warmblood breeding?	Emma Thorén	2005, 2006	Thorén, Emma	SLU
	Dynamic laryngeal collapse associated with poll flexion in Coldblooded Trotter Racehorses: pathogenesis, diagnosis, and treatment	Eric Strand A	2010, 2011	Strand A, Eric	
	The horse farm - From family project to lifestyle entrepreneurship	Erika Andersson Cederholm	2010, 2011	Andersson Cederholm, Erika	

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	The Impact of Horse Assisted Therapy (HAT) on Addiction Therapy and Outcomes	Espen Arnevik	2011	Arnevik, Espen	
V0747002	The occurence of Parascaris equorum in foals and in paddocks on studs with different management and the efficacy of different anthelmintics upon the shedding of eggs from P. equorum.	Eva Osterman Lind	2007	Osterman Lind, Eva	SVA
	New diagnostic and prognostic methods in equine osteoarthrits	Eva Skiöldebrand	2010, 2011	Skiöldebrand, Eva	
	The equine type I interferon system - a key component in the defense against infections	Eva Wattrang	2010, 2011	Wattrang, Eva	
H0647176	Equine dental caries - studies on the immune response to Streptococcus devriesei	Ewa Wattrang	2007, 2008	Wattrang, Ewa	SVA
	Genetic study of a developmental skeletal defect in the Shetland pony	Gabriella Lindgren	2009, 2010, 2011	Lindgren, Gabriella	
447002	A genome scan to detect candidate genes for atopic dermatitis in the horse	Gabriella Lindgren	2005, 2006, 2007	Lindgren, Gabriella	SLU
	Herd-related polyneuropathy in horses - with focus on cases, herds and the occurence of moulds and neurologically active mycotoxins in wrapped forage	Gittan Gröndahl	2007, 2008	Gröndahl, Gittan	
H0547117	The Horse As A Therapeutic Tool - About Therapeutic Riding, Wellbeing and Lifequality	Gunilla Silfverberg	2006, 2007	Silfverberg, Gunilla	Ersta Sköndal Högskola
	Therapeutic riding - facts and future	Gunilla Silfverberg	2009, 2010	Silfverberg, Gunilla	
447026	Remoistening and Formation of Mould in Hay for Horses During Storage.	Gunnar Lundin	2005, 2006	Lundin, Gunnar	JTI
	Pulmonary effects of iNO in anesthetised and recovering horses	Görel Nyman	2011	Nyman, Görel	
	The effect of 1% hydrogen peroxide cream (LHP) on bacterial colonisation and wound healing in the horse.	Hans Broström	2010	Broström, Hans	
H0747209	Oats, Trichothecenes. Effects and degradation by trotters.	Hans Pettersson	2008, 2009, 2010	Pettersson, Hans	SLU
	Pain therapy using lidocaine or dexmedetomidine in horses.	Henning Andreas Haga	2010, 2011	Haga, Henning Andreas	
H0547119	Quality assessment of stallion semen för AI - Development of methods for handling and diagnostics	Heriberto Rodriguez-Martinez	2006, 2007	Rodriguez-Martinez, Heriberto	SLU
	Gastrointestinal nematodes in horses: a survey of anthelmintic resistance and control measures against parasitic infections.	Inger Sofie Hamnes	2010, 2011	Hamnes, Inger Sofie	
	The importness of Nicoletella semolina at horses with respiratory disease	Ingrid Hansson	2009	Hansson, Ingrid	
H0647165	Inherited defects in horse breeding - a review of the state of knowledge and a pilot study	Jan Philipsson	2007, 2008	Philipsson, Jan	SLU

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	Genetic variation in orthopedic health, limb and hoof conformation and their relationships with performance and durability of young riding horses	Jan Philipsson	2011	Philipsson, Jan	
H0747189	Reactive Oxygen Species (ROS) in stallion semen; their origin, effect on spermatozoa and possibilities for control.	Jane Morell	2008, 2009	Morell, Jane	SLU
	New methods to assess and optimise fertility in breeding stallions	Jane Morrell	2011	Morrell, Jane	
	Genome-wide association study to identify genes regulating cryptorchidism in horses	Jeanette Axelsson	2010	Axelsson, Jeanette	
447034	Decreased substrate availability of fat during recovery might be a liiting factor for glycogen resynthesis in muscle tissue in standardbred trotters	Johan Bröjer	2005	Bröjer, Johan	SLU
H0847242	Glucose and leucine as a potential aid in the resynthesis of muscle glycogen after streneous exercise in Standardbred trotters	Johan Bröjer	2009	Bröjer, Johan	SLU
	Glycemic and insulinemic response to feed with different water soluble carbohydrate content in horses	Johan Bröjer	2010, 2011	Bröjer, Johan	
H0747206	Epidemilocigal studies of Parascaris equorum in foals at Swedish stud farms with focus on the survival of Parascaris equorum eggs in different environments.	Johan Höglund	2008, 2009, 2010	Höglund, Johan	SLU
H0647122	Improved detection of upper airway problems in horses: Comparison of conventional /treadmill based videoendoscopy to recordings from a newly developed field based wireless in situ upper airway video camera.	John Pringle	2007, 2008	Pringle, John	SLU
447041	Markers of inflammation within bronchial tissues in horses with recurrent airway inflammation	John Pringle et al	2005	Pringle, John	SLU
H0747211	Proximity ligation assay for detection of Borna disease virus infections	Jonas Johansson Wensman	2008, 2009	Johansson Wensman, Jonas	SLU
	Evaluation of the rider´s seat and the fit of the saddle using measurement of pressure	Karin Morgan	2009, 2010, 2011	Morgan, Karin	
	Forward march! Equestrian education, leadership and learning environment - from military activity to a sport for girls	Karin Morgan	2011	Morgan, Karin	
	Evaluation of the motion pattern of the horse at lunging.	Karin Roethlisberger Holm	2011	Roethlisberger Holm, Karin	
	The importance of low virulent viruses and subclinical respiratory infections for trotters in Sweden and Norway	Karl Ståhl	2010, 2011	Ståhl, Karl	
	A new experimental model to study metabolic derangements in horses	Katarina Nostell	2010, 2011	Nostell, Katarina	
H0547075	Cardiac troponin I as a biomarker for myocardial injury in horses	Katarina Schuback-Nostell	2006, 2007	Schuback-Nostell, Katarina	SLU
	Early detection methods for tarsal osteoartrosis in the Icelandic horse using three dimensional morphometric parameters, diagnostic imaging and molecular markers.	Kerstin Hansson	2009, 2010, 2011	Hansson, Kerstin	

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447021	Interaction between horse and rider described with objective methods	Lars Roepstorff	2005	Roepstorff, Lars	SLU
	Movement and ground properties of training and competition arenas for horses - Biomechanical and epdimiological field studies and methodological devlopment	Lars Roepstorff	2007, 2008	Roepstorff, Lars	
	Construction and maintenance of surfaces on trotting tracks - measuring physical and functional determinants	Lars Roepstorff	2011	Roepstorff, Lars	
	Economic growth potentials in the norwegian and swedish equine sectors in a national and regional perspective	Leif Jarle Asheim	2010, 2011	Asheim, Leif Jarle	
H0647157	Particle load in the stable environment - impact on human and equine airway inflammation.	Lena Elfman	2007, 2008	Elfman, Lena	UU
H0847240	The usage of 3D air dispersion models for calculation of the spread of horse allergen and odour around equestrian centres	Lena Elfman	2009, 2010	Elfman, Lena	UU
	Assessing and alevaiting pain in horse	Lena Olsén	2011	Olsén, Lena	
	N/A	Margaretha Håkansson	2007	Håkansson, Margaretha	
H0747192	To test and implement methods to improve the rider´s seat and position on Swedish riding schools	Mari Zetterqvist Blokhuis	2008	Zetterqvist Blokhuis, Mari	Ridskolan Ströms-holm
H0547072	Develop methods to improve the rider´s seat and position and measure advantages for the rider and the horse	Mari Zetterqvist Blokhuis	2006, 2007	Zetterqvist Blokhuis, Mari	Ridskolan Ströms-holm
H0847207	EPO MAIIA – A Novel, Sensitive and Rapid Test for Suspected rhEPO Doping of Horse including a Unique Affinity-Monolith Purification of EPO from Urine	Maria Lönnberg	2009, 2010	Lönnberg, Maria	UU
	Protective covering of hay to prevent mould growth during winter storage	Martin Sundberg	2009, 2010	Sundberg, Martin	
	Young women as grooms and men as professional trainers. Gender hierarhies in Swedish harness racing.	Mats Greiff	2008, 2009	Greiff, Mats	
	Horse Power for Entrepreneurship - Horse-Based Enterprising from a gender Perspective	Mats Westerberg	2009, 2010, 2011	Westerberg, Mats	
H0547146	Studies on an in vitro system for production of drug metabolites for the doping control	Mikael Hedeland	2006, 2007	Hedeland, Mikael	SVA
H0547189	Exposure to risk of accidents and high physical load at riding and trotting schools.	Niklas Adolfsson, Anna Torén	2006, 2007	Adolfsson, Niklas	JTI
	Joint Nordic breeding value estimation of riding horses- NORDIC INTERSTALLION	Odd Vangen	2010, 2011	Vangen, Odd	
447005	Studies of Equine Ehrlichiosis	Peter Franzén	2005	Franzén, Peter	ATG Hästklinikerna AB
	Horse welfare, interest conflicts, and normative ethics	Petra Andersson	2011	Andersson, Petra	

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447046	Studies of transport proteins of relevance for disposition of drugs in horse	Pia Larsson	2005, 2006, 2007	Larsson, Pia	SLU
H0747199	Studies of enzymes and transport proteins with importance for harmful effects, diseases and disposition of xenobiotics in horse.	Pia Larsson	2008, 2009, 2010	Larsson, Pia	SLU
	Working environment in trotting stables	Qiuqing Geng	2011	Geng, Qiuqing	
	Reproduction in the horse: Semen quality and production routines on shipped semen from norwegian coldblood trotters.	Ragnar Thomassen	2011	Thomassen, Ragnar	
	Immune reactivity in the intestinal mucosa of healthy horses and of horses with chronic inflammatory bowel diseases	Ronny Lindberg	2010, 2011	Lindberg, Ronny	
H0547062	Development of a scintigraphic method to evaluate renal function in horses	Sara Larsdotter	2006	Larsdotter, Sara	SLU
	The effect of water availability and water temperature on water intake, behavior and fluid balance in the horse	Sara Nyman	2009, 2010	Nyman, Sara	
H0547003	Horse safety on the roads	Stefan Pinzke	2006	Pinzke, Stefan	SLU
H0747170	Working with horses in a correct way	Stefan Pinzke	2008, 2009	Pinzke, Stefan	SLU
	Farriers working environment - A survey for improved measures	Stefan Pinzke	2010, 2011	Pinzke, Stefan	
H0547061	Biomarkers of inflammation and connective tissue meatbolism in the joint of intensily training horses	Stina Ekman	2006, 2007, 2008	Ekman, Stina	SLU
	The role of ínflammaroty mediators in equine osteoarthritis (OA).	Stina Ekman	2011	Ekman, Stina	
447045	Inflammatory markers in early equine osteoarthritis	Stina Ekman et al	2005	Ekman, Stina	SLU
H0547154	Work, culture and power in Swedish horse- and harness racing 1900-2005	Susanna Hedenborg	2006, 2007	Hedenborg, Susanna	UU
H0747184	Equestrian sports in Swedish daily press from a gender perspective	Susanna Radovic	2008	Radovic, Susanna	GU, University of Gothenburg
	Riding teachers´ conceptions of and conditions for communication with their students	Ulla Riis	2007, 2008, 2009, 2010	Riis, Ulla	
	Riding Teachers´ Conceptions of and Conditions for Communication with Their Students II	Ulla Riis	2011	Riis, Ulla	
H0647164	The prevalence of methicillin resistent Staphylococcus aureus in horses in Sweden	Ulrika G. Andersson	2007, 2008	Andersson, Ulrika G.	SVA
	Development of hygiene protocols in Swedish equine veterinary medicine in order to prevent nosocomial infections including MRSA	Ulrika G. Andersson	2009, 2010, 2011	Andersson, Ulrika G.	
447061	New PCR-diagnostics for strangles	Viveca Båverud	2005, 2006, 2007	Båverud, Viveca	SVA
	Subclinical respiratory infections in horses	Viveca Båverud	2011	Båverud, Viveca	
	Genetic analyses of indicators of longevity in Swedish riding horses	Åsa Braam	2007, 2008, 2009	Braam, Åsa	

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447060	Multitrait genetic evaluation of Swedish Warmblood Horses	Åsa Viklund	2005, 2006, 2008	Viklund, Åsa	SLU
H0847216	Genetic progress and strategies for selection based on integrated breeding values for Swedish Warmblood horses	Åsa Viklund	2009, 2010	Viklund, Åsa	SLU