

Swedish-Norwegian Foundation for Equine Research



The Horse Industry Research Programme 2016–2019



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1. Background

The Swedish Foundation for Equine Research -Stiftelsen Hästforskning (SHF) was founded in 2004 by the Swedish Horse Industry Foundation- Hästnäringens Nationella Stiftelse (HNS) in collaboration with The Swedish Horse Racing Totalisator Board -AB Trav och Galopp (ATG), Swedish Farmers' Foundation for Agricultural Research – Stiftelsen Lantbruksforskning and Agria Animal Insurance – Agria Djurförsäkring. ATG and Agria are committed to promoting equine research and allocate funds every year to SHF. The Swedish Research Council, Formas has also been allocating funds from the Swedish government for co-funded research.

In 2009, collaboration on horse research was initiated between SHF and the Research Council of Norway. The other Norwegian financiers were Norsk Rikstoto and “Research funds over Agriculture Agreements” (“Forskningsmidler over Jordbruksavtalen”). In Norway, Norsk Hestecenter works to promote horse research, coordinates Norwegian stakeholders and participates in the board work of SHF and the research committee. The agreement between the two countries aims to promote joint projects in research and development. Through this cooperation Norway utilises the research administration created by SHF and the Stiftelsen Lantbruksforskning, among other things.

This research programme was drawn up by SHF during the autumn of 2015 and is intended to run from 2016 to 2019. A strategic plan developed as a joint effort by both the Swedish and Norwegian stakeholders is connected to this research programme. Both the research programme and the strategic plan are reviewed annually by the Board, which has the main responsibility for the development and implementation of established plans. The SHF strategy document includes a current situation assessment that describes, inter alia, the needs, development and challenges of the horse sector, as well as the strategic goals. The research programme and the strategic plan can be found at www.hastforskning.se and www.nhest.no.

2. Purpose

The main purpose of horse research is first and foremost to find new knowledge that contributes to the welfare of horses, increase the value created and promote the development of the equine industry on the whole. The research results can also contribute to identifying new business areas in the horse industry, improve knowledge and quality in horse keeping as well as strengthen the relationship between horses, humans and society. By contributing to good and continuous contact between the horse industry and the research community, relevant research projects will be initiated and financed.

3. Programme areas

The research areas that are prioritised by SHF's strategic focus include: equine health, feeding, reproduction and technological development as well as areas concerned with the role of the horse for humans, society and the environment.

Therefore, the research programme is divided into two areas:

Veterinary medicine, animal science and technology science

- Health and welfare
- Reproduction
- Feeding, breeding and horse keeping
- Technological development

Social science and humanities

- The role of the horse for humans
- The role of the horse for society
- The role of the horse for the environment

SHF would like to emphasize the importance of collaborative projects between Sweden and Norway and the goal of financing both programme areas according to the strategic plan that has been established.

Proposals for research areas that the horse industry prioritises within each programme area are listed below in the Appendix.

4. Call for research applications, application process, evaluation criteria

The call for proposals is comprised of two stages. In stage 1, the applicant must submit a concept overview that is evaluated in terms of relevance and potential. The proposals that proceed to stage 2 are then required to submit a full application that will be evaluated in terms of relevance and scientific quality. Successful applicants will be awarded grants for research projects that are of high scientific quality, and very relevant for the horse industry. As funds are limited, the research programme does not include direct innovation projects, but rather focuses on research, as in some cases these can also lead to innovation projects. These projects often require the registration of a patent. If this is the case, it is the policy of SHF that any profits generated through a patent should be returned to the financing of research within a (3 – 5 year) time period. Research funding and patents will for the foreseeable future be handled in the same way that they are handled today. That is, the patent cost will not be financed.

Each programme area has its own review panel and a chairperson, proposed by a Nomination committee that has been appointed by the Board of SHF. Each panel is comprised to ensure necessary competence for the programme areas regarding relevancy as well as scientific merit. The respective chairpersons are experts in their fields. The review panel assesses, evaluates and prioritises the applications that are submitted to SHF. After stage 2, the review panel submits their findings to the Board regarding which projects should or should not be granted. The review panel also evaluates the early applications and the final reports.

The evaluation criteria can be found in Stiftelsen Lantbruksforskning's Handbook. See www.lantbruksforskning.se

5. Knowledge dissemination

The publication of the research results in scientific journals is a given for every project. The research findings should also be submitted to popular science publications, in order to reach the entire horse industry.

Whenever presenting a project funded by SHF (be it in an article, publication or interview etc.,) the researchers are required to mention that the Swedish-Norwegian foundation for Equine Research is responsible for the funding of that project.

Appendix

Research Areas

The following are research suggestions within each programme area that the horse industry would like to prioritise. The descriptions should merely be regarded as suggestions and not as restrictions for the project applications.

Veterinary medicine, animal science and technology science

Health and welfare

Orthopaedic injuries

Performance impairment in horses, primarily due to orthopaedic disorders, is an area of particular importance. Increased knowledge is required concerning what causes orthopaedic injuries, how to reduce the number of injuries and how to prevent them. In the case of orthopaedic injuries, a holistic view of the horse should be adopted, as most injuries are likely due to multiple factors.

Research areas:

- The significance of breeding
- The significance of the track surface
- The normal physiological strain on extremities and the back
- Different treatment and rehabilitation methods
- Modern objective examination methods for the investigation of lameness

Viral infections

Viral infections, including those of a low-virulent nature and those with mild symptoms of disease affect the health of the horse and the economic situation of the trainer and the owner negatively. It is not desirable for a horse to compete while infected with a virus.

Research areas:

- Better and cost-effective methods of identifying and diagnosing infection in horses before they are going to race
- The spreading of exotic infections due to increased international breeding and competition exchange

Bacterial infections

Diseases caused by bacteria that present a major problem for the horse population should be studied in more detail.

Research areas:

- The streptococcal infection Strangles
- The presence and spread of resistant bacteria, also multi-resistant
- Alternatives to antibiotic usage in the treatment of for example, mud fever, abrasions, equine metritis and respiratory problems, as well as “preventive measures” during surgery

Parasitic infections

Endo-parasitic infections such as tapeworm, roundworms, bloodworms and bots and ecto-parasitic infections such as equine lice and leg mange cause suffering in horses. Both preventative measures and treatments are required. Increased resistance against anti-parasitic drugs has become a worldwide problem, whereby effective treatment will soon be lacking for the protection of foals and ponies from e.g. bloodworms and roundworms.

Research areas:

- Strategies for minimising the spread of infection, pasture hygiene, pastoral usage, routines for monitoring and controlling parasite infection and resistance
- The development of resistance towards anti-parasitic drugs
- Environmentally sustainable treatments that do not lead to the rapid increase of resistance

Infectious disease control (Biosecurity)

Infectious disease control, or Biosecurity, entails protecting horses, humans and the environment from exposure to contagious biological material. At present horses travel a lot within and outside of the country and have contact with a lot of other horses, which increases the risk for infection. The presence of resistant bacteria that can cause infections between animals and humans is increasing. Within the medical care of horses, infections related to treatment occur, these must be minimised.

Research areas:

- Infection risks, routes of infection and preventative measures
- Documentation that supports the design of evidence-based, efficient and cost-effective biosecurity practices and technologies
- Documentation that supports hygiene plans, self-inspection programmes, planning of events and routines involving travel and the exchange of horses, as well as medical routines for veterinary clinics and equine hospitals

Hereditary, disease and injury statistics

The possible role heredity plays for certain diseases and breeding should be considered and studied further.

Research areas:

- Utilisation of medical data regarding which diseases are hereditary and which environmental factors affect disease
- Injury statistics, particularly injuries that lead to culling, to determine how heredity controls a horse's durability and how this can be incorporated in the assessment of offspring

Training and Durability

In addition to focusing on talent, temperament and a good exterior, work on ways to produce healthy horses needs to be strengthened. This is very important from animal welfare and ethical perspectives. In addition, work-related injuries concerning the horse's mobility apparatus are perhaps the greatest obstacle for every horse to be able to reach its full potential today.

Research areas:

- How incorrect training can adversely affect durability
- The impact training can have on young horses
- The importance of a good riding foundation for the durability of riding horses
- What is a suitable riding school horse
- Ill-health based on ignorance in the handling of horses
- Methods to determine deviations in the rider's seat and its impact

Health economics

Health economics is a very important area, as there is currently no collected data on healthcare expenses /costs for horses. Knowledge of the expenses/costs of individual illnesses as well as the

economic significance of certain illnesses would be useful for the breeding of healthier horses. Today the diseases of individual horses are not registered nor is there a central national register .

Research areas:

- The frequency of different diseases and the costs associated with them
- Information on how to obtain national records of disease and injuries
- The impact insurance systems have on attitudes and decisions made by veterinarians and animal owners associated with horse welfare

Doping and prohibited medicating

It should be of the utmost importance for all equestrian sports that horses compete on equal terms and are free from the influence of foreign substances, which is regulated both by legislation and the rules governing the sport. Thanks to research efforts, work on anti-doping has been kept at a high level.

Research areas:

- Elimination times, detectability and effect of doping and therapeutical substances
- Determination of screening limits in order to avoid positive cases due to contamination

Animal welfare and prohibited treatments/ measures

A Nordic and international animal welfare cooperation is in place where more knowledge is needed regarding various prohibited measures and prohibited treatments and how these can be detected.

Research areas:

- Effects of improper equipment and whipping
- The occurrence of incorrect practices during training (which cause pain or unpleasant experiences for the horses and force the horse to perform beyond its normal physical ability)
- Develop the necessary tools to improve educational efforts and raise awareness of which requirements must be imposed on people who are responsible for horses but lack knowledge of their physical and mental abilities
- The potential positive or negative effects of alternative-medicine treatments, particularly from an animal welfare perspective

Reproduction

Reproduction measures

The foundation of a successful and viable horse industry is the presence of a good pedigree and breeding that can produce healthy and viable robust horses.

Research areas:

- Why the percentage of born foals has not risen despite extensive work by veterinarians and large investments made by breeders
- Better measurement of fertility than is currently used today
- Improved assessment of the reproductive characteristics of both the mare and the stallion need to be developed, e.g. more and safer parameters for breeding and birth results

Genetics

Genetic mapping and the role of genetic composition both for breeding as well as for performance, durability and genetic variation in relation to breeding values remain important areas.

Research areas:

- Conservation of national breeds, for example mapping inbreeding and population size

Causes of reduced fertility

Inflammation of the uterus is the single largest cause of infertility among mares. Uterine inflammation (equine endometritis) that is not detected and treated in time can lead to chronic injury of the uterine mucosa.

Research areas:

- Methods for early detection of uterine inflammation
- Diagnosis of other causes of reduced fertility, such as early abortions

Foal diseases

During the suckling period there are a number of diseases that can affect the foal. Common diseases are foal diarrhea and respiratory tract infection that can lead to severe pneumonia. A number of foals are treated with antibiotics each year for these diseases. This is a problem that causes suffering for the foal and costs for the owner as well as increases the risk of antibiotic resistant bacteria in the environment

Research areas:

- Identification of the reasons why certain diseases occur, including identification of risk factors within horse husbandry, as well as finding early markers in order to make the correct diagnosis early on
- Impact of transporting foals and the change of environment, the risk of an increase in the levels of infection that the system of semen stations entails, should be studied further

Insemination and sperm quality

Some stallions despite a seemingly low sperm quality still achieve an approved/high pregnancy rate. Other stallions have a high semen quality but achieve low pregnancy rates. The method used today to assess the fertility and sperm quality of stallions, motility (sperm mobility) is a rough estimate that does not sufficiently correspond to the fertility level of the stallion.

Research areas:

- What controls the reproductive ability of a stallion and how should it be assessed

Frozen sperm

An increasing number of mares are inseminated with frozen sperm and knowledge in this area should increase at the same rate. Today the use of semen with frozen sperm requires a lot of effort and economic costs to the mare's owner.

Research areas:

- Methods for the handling of frozen sperm
- Documentation that supports the assurance of quality using international standards of frozen sperm, as there are individual differences how well sperm freezes between stallions

Transport sperm

In order to avoid transporting mares together with foals over longer distances, the transporting of sperm has increased significantly in recent years. Double doses are required when fresh semen

is used. This means that it might be difficult to obtain enough sperm from desirable stallions, as the doses may not suffice.

Research areas:

- Technology for insemination with fewer sperm doses

Feeding, breeding and horse husbandry

Improved knowledge is needed concerning the importance of feeding and breeding for the welfare, durability and performance of horses. In order for the keeping of horses to occur as naturally as possible the effects of different housing systems, outdoors visits as well as pasture conditions should be investigated further. The potential health risks of these should also be examined more closely.

Feed production and feed systems

The horse has evolved to eat grass and roughage. These as well as feed constitutes the basis of their diet.

Research areas:

- Which botanical compositions are best suited as roughage and feed for horses
- Production and preservation methods of optimal roughage so that the horse can be offered a uniform quality of roughage throughout the year
- A feeding system that is suited to both small and large flocks with minimal spill and damage at a reasonable cost

Horse feed

In order for horses to develop and function properly high demands are made on their feed.

Research areas:

- How horses should be fed in an optimal way to be able to meet the demands placed on them on the racetrack
- Feed connected to various developmental disturbances and “Diseases of affluence”
- Equine metabolic syndrome, connected to insulin resistance and laminitis

Feed evaluation

There is a need for better knowledge of how the nutritional content of different feed can be evaluated for the horse. One must also be able to meet the increased level of controls imposed on all feed producers through the feed hygiene regulation.

Research areas:

- How the horse is affected by the microbiological quality of the feed

Housing and building systems

Breeding is occurring less in boxes and more frequently in various forms of loose housing systems to be able to imitate natural breeding conditions as much as possible. At the same time, the goal is to stimulate movement and activity to provide healthy and durable horses.

Research areas:

- The design and placement of open sheds that ensure the horse's possibility for rest
- Paddocks requirements that ensure a balance between movement and rest
- What is an optimal flock
- Minimising the risk of injury for both horses and caretakers
- Labour saving and cost-effectiveness

Horse keeping

The effects of the new forms of horse keeping systems need to be examined for example, group horse keeping.

Research areas:

- Welfare indications in group horse keeping

Technology development

Sport technology – product development

Technology and material development is needed to find methods of measurement that work in the field (stable, bridleway, paddock, transport etc.). Similarly, objective methods of measurement (whenever possible) within the various equine sports and the transference of data to the various groups at sporting events (audience, owner, trainers, veterinarians etc.) are needed.

Research areas:

- Monitoring and prognosis of the health status of the horse
- Monitoring and analysis of training
- Injury prevention through well-adapted equipment for horse and rider
- Injury prevention in stables
- Good stable environment
- Interaction with spectators of the sport and data transfer
- Data analysis
- Material science
- Scanning techniques

Social Science and Humanities

The horse's role for humans

The horse's role in human recreation and leisure

Horses and equestrian facilities play a social role for children and adolescents as they contribute to the training of their motor skills, physical strength, empathy, social skills, time spent in the fresh air and more.

Research areas:

- The importance of the environment of the equestrian facility and the contact children and adolescent get with the horses for their social development
- If the environment of the riding school is comparable with the natural environments of schools and preschools regarding the impact on motor skills and cognitive development in growing individuals
- How riding schools – and in some cases trotting schools – can increase the recruitment of students and adapt their activities to the combination of horses and children
- How the social environment of the facility with riding, driving and horse training can be adapted for the presence of children and adolescents
- How the learning and pedagogics of the facility in terms of riding, driving and training horses can be developed and designed so that children, adolescents and adults can develop as riders and as future “horse people”

The horse's role in human health care

The horse has increasingly been used to promote health, wellbeing and life quality of humans, through horse assisted therapy among other things. This type of therapy includes both mounted and unmounted activities as well as activities in the environment surrounding the horse. However, investigation of the horse's function as a therapeutic resource is incomplete. As the area "The horse's role in human health care" is multidisciplinary, studies that conduct empirical research that interacts with theoretical analysis within the humanities is prioritised.

Research areas:

- Clarification of the various roles the horses can have in different forms of care, social-pedagogical treatment and rehabilitation
- Investigate the importance of exercise/ recreational horseback riding for combating lifestyle- related illness from a public health perspective
- Health economy of riding as self-care for persons with residual disabilities after injury or illness
- The value of the horse industry for individuals and society with regards to so-called marginalised groups as well as with an age and gender perspective
- How horses affect people's lifestyle in different age groups and socio-economic groups, as well as people in urban versus rural areas
- The ways in which activities of the horse industry, including the various equestrian sports, could be developed to promote health more

The horse's role for society

The economic importance of the horse industry

The horse industry is an important part of the agricultural sector and one that has potential for economic growth. The greatest area of potential is believed to be the positive development of existing companies. Research that illuminates and stimulates the horse's place in society is important for the continued growth of the horse industry. Horse businesses often depart from an interest in horses, or activities surrounding them. This means that full focus of the businesses is not given to commercial or economic considerations. Small horse businesses in the countryside are often started and run by women. Women usually run their horse businesses differently than traditional farms run by men.

Research areas:

- The economic importance of the horse, locally, regionally and nationally
- Profitable horse based entrepreneurship
- The possibility for increased professionalization and commercialism within the industry
- Economic systems that recognise female-run businesses without using the male corporate structure as the norm

Development of services

Technological development without knowledge of the people who ultimately use the products can lead to products that fail on the market- even when the technology is at its best. That is why service innovations/development has increasingly become an important ingredient for companies that want to be competitive in the future. This may for example, involve new ways of charging for a service or product, how these can be delivered or how to develop the customer's experience.

Research areas:

- Service development
- Service marketing
- Service organisation
- Business models

System analysis

The function of system analysis is to create a better comprehensive view so that one can meet all the complexities that a challenge presents. Using system analysis tools and methods allows one to break down complex systems and provide concrete advice to e.g. decision-makers. The technology is integrated in a broader context using methods that utilise for example - innovation and policy analysis, life-cycle analysis (LCA) of products and services, development and evaluation of services, Technical Innovation Systems (TIS).

Research areas:

- Technical Innovation System of various new services and products
- Business and organisational models
- Life-cycle analysis
- Service development

Application of research

Profitable breeding businesses

Horse breeding cannot be developed in the long run if it is not economically sustainable. As with other parts of animal husbandry in the agricultural sector rationalisation and “smart solutions” are required in order for the industry to survive and develop and therefore the economy of horse breeders must be scrutinised. Horse breeders will then be able to get help developing their businesses without compromising the wellbeing of horses.

Research areas:

- Clarify costs and revenue, different key indicators and rationalisation gains in the breeding industry
- Ownership structures and how economic conditions may have changed for horse owners

Quality assurance

It is common in large parts of the horse industry that the expectations on the components of the services they provide are unclear. Many farms for example, offer horseback riding as one of several activities that run parallel to traditional farming. A quality system can in principle contain all the elements of the “production process” for horse services - from requirements on education and competence, to animal welfare, technical facilities, work environment, reporting and control.

Research areas:

- Development of the content - and consequences of - a quality system for the horse industry, where among other things safety when using horses is central

Equestrian Tourism

Equestrian tourism is a growing area with great potential for the future. It can actively contribute to a positive development of the horse industry’s social-economic importance for the countryside, farming and tourism.

Research areas:

- New possibilities and limitations within equestrian tourism including people’s attitudes and perceptions

- Equipment, stress and endurance as well as indicators for animal welfare

Urban planning

The horse constitutes a strong bridge between the city and the countryside and contributes to what makes the countryside attractive as well as providing increased insight into the green sector. Horses make the countryside more attractive to live in and visit, which contributes to a foundation for infrastructure, service, recreation, and rehabilitation/health.

Municipalities point to e.g. allergens and reject applications for construction of new houses. At the same time planning is going on in several parts of the country to complete horse villages, these are a combination of housing with adjacent communal stables.

Research areas:

- Attitudes and allergy problems

Society's view of horses and horse keeping

The view towards animals, in particular horses, is changing in our society. Here the study of how values and ethical perceptions of horses are expressed is of great interest; to which extent are horses seen as a subject or an object and what obligations should humans have towards horses. This is not a discussion that is only being carried on within horse circles in Sweden, but the surrounding community also has views on how horses should be handled and used. The consequences of slaughter and euthanizing horses are unexplored areas.

Research areas:

- What ideas and beliefs about horses are supported and reflected by different horse cultures within and beyond our borders
- How problems are resolved within horse keeping and the horse industry when their ideas and ideals come in conflict
- How to research "good horsemanship"
- Slaughter transport distances and conditions
- The possibility for an increased utilisation of horse meat in food production

Equality, safety and the work environment

With the growing importance of horses in society the need for increased knowledge about equality, safety and working environment - for example for companies run by women.

Research areas:

- Gender issues and a more even gender distribution connected to the horse industry
- Ethnicity issues
- Safety and working environment questions

The role of the draft horse for society and businesses

Research that studies the potential of the draft horse in modern society, will mean partly new tasks, such as in park management, urban forestry, small scale farming, tourism, event driving and more. In several of these areas, there is a need for more effective tools. There is a need for research and development of both forestry, agrarian and community service equipment.

Research areas:

- Technical solutions for today's forest wagons (including the need for horse drawn crane trailers) to optimise work
- Horse drawn equipment for park and garden care, garbage collection, snow removal, and sanding

- The role of utility horse entrepreneurs in urban businesses from a sustainability perspective (economic, social and environmental)

The horse's role for the environment

The horse as a resource for sustainable social development and its environmental impact

Horses have an important function for keeping landscapes open and as a grazing animal for the biological diversity. This is a challenge to many people's ideas and perceptions since the horse is not seen as a nature and landscape conservationist. In the area of land use, collision between values and conflicts of interest are central when many parties must agree on use of the very limited land resources in the vicinity of cities. . Horse manure can provide nutrients and humus, which creates conditions for a bio-loop circuit, as well as provide increased income opportunities for agricultural entrepreneurs.

Research areas:

- How horses could be caretakers of the landscape. For example, investigate integrated land usage whereby horses do not become overweight by grazing in the pasture and at the same time making sure that they graze the land that benefits most from a biodiversity perspective
- Urbanisation that coincides with the "horsification" of the land surrounding cities – which social and cultural phenomena and which social – cultural patterns are created by it
- How the horse industry can contribute to the social and economic development of the countryside, at the same time contributing to the environmental goals
- Ecologic and economic solutions for the handling of manure in urban areas