NEW ZEALAND
EQUINE
TRUST

Partnership for Excellence

About

Several Partnerships for Excellence have been set up by the Crown to enable the New Zealand government to make significant new investments – matched by investment from relevant industry group – in the public tertiary education sector. The aim is to benefit business and industry, and improve outcomes for people, organizations, and communities by increasing knowledge and its application.

One of these Partnerships is the Equine PfX. This official partnering of equine industry groups and government utilises the capabilities of Massey University and many other partners inside and outside New Zealand to assist in improving the equine industry's future progress. The initiative aims to expand learning and research capabilities across the industry, and thereby encourage more skilled people within the industry to help it improve efficiency and solve problems.

Relationship between Massey University Foundation and Equine PfX

The Foundation manages/invests the $5 million (PfX monies supplied by the government). The income from this investment, less an adjustment for inflation, will be available each year to the trustees of The Equine Trust to invest in research and education projects. The Foundation is also responsible for auditing disbursements by The Equine Trust. Money coming from industry partners (such as the New Zealand Racing Board) pass through the Foundation are held in a separate (non-invested) account where they are dispersed to set projects that have been agreed between the Equine Trust Board and the industry partner.

The Equine Trust Board will recommend and report to the Massey University Foundation Board (through the Massey University Foundation Board member that is on the New Zealand Equine Trust Board) the funding projects that will assist the achievement of the research and teaching outcomes of the Partnership for Excellence.

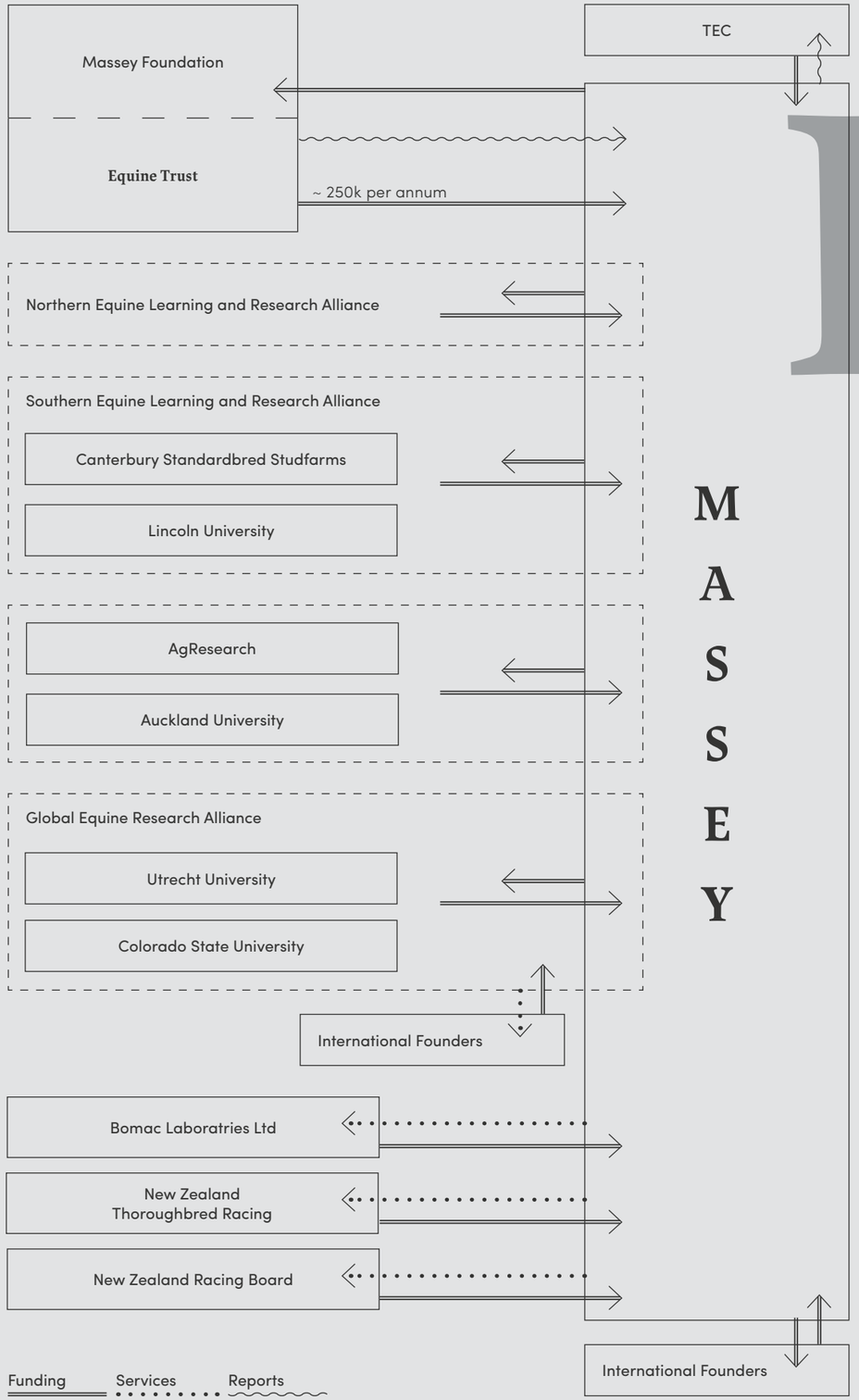
Outcomes

Tertiary Education Commission policy requires that the partnering must produce improvements that are sustained and not brief, are reached through learning that is research-led, and that would not have occurred had it not been for the government initiative and the partners' investment.

To achieve these requirements, the Partnership therefore is concentrating on:

- increasing the number of people taking extramural equine studies courses,
- improving the quality of teaching to veterinary undergraduates,
- involving more postgraduate students in industry research,
- contributing to professional development of veterinarians,
- ensuring that these can be supported and continued long term, by annual allocation of the proceeds of Equine Trust funds in suitable learning and research projects.

The requirements will be met if more people can identify problems, understand the science required to mitigate them, work together to reach science solutions, and then be receptive to spreading that knowledge across the industry.



Partners

The partnering involves several organisations in New Zealand, among them the NZ Racing Board, New Zealand Thoroughbred Racing, Bomac Laboratories, as well as collaboration with Lincoln University, Auckland University, AgResearch, and major overseas universities including Utrecht University (Netherlands) and Colorado State University (USA). Massey University is itself investing heavily in the Partnership, in the form of improved facilities for learning and research, and appointment of new staff. As appropriate, the partnering could involve other appropriately skilled research or education providers, and Industry bodies as shown on the schema.

The major equine health and production problems which limit the breeding, rearing and performance of horses in this country will be targeted. Veterinarians and managers of equine enterprises will be able to propose areas for research and teaching and have the opportunity to collaborate on research projects.

It is Massey University which is responsible to the Tertiary Education Commission, in respect of governance and funding issues, and ensuring that the aims of the Partnership are met. The guardianship of the government capital and the allocation of funding to appropriate research and learning projects lie with the Equine Trust, which performs these duties at no cost.

The Partnership role at Massey University was directed by Professor Elwyn Firth and he served from 2005 to 2010 and is now directed by Professor Hugh Blair. Researchers and postgraduate students in the Institute of Veterinary Animal and Biomedical Sciences, and other institutes and colleges across Massey University can thus work on projects initiated by the equine industry.

Another major strength of the Partnership is the expertise and facilities available through the formal collaborative arrangements with other PfX partners, including those of other universities. In summary, there is a collective expertise and capacity available to work on any project required.

The awarding of all research grants both funded by the Partnership for Excellence corpus administered by the New Zealand Equine Trust as well as funds from the New Zealand Racing Board are based on recommendations from scientific review by members of the New Zealand Equine Trust Board and ad Hoc reviewers as needed.

There are two different paths through which PfX projects can be proposed, refined and funded.

Research Funding

1. Industry funded projects

Any person, industry sector, business or partner involved in the Industry can directly propose a project. The aim of the project would be improved outcomes for that person or business or sector.

For instance, scientifically investigating the cause of a particular problem affecting horse health on a particular farm, could lead to better prevention or treatment to alleviate the problem, thereby improving horse health and performance, reducing cost and improving profitability. The project is defined by the problem and its possible solutions. The person, business or entity funding the project gets the benefit of the results and their application, which contributes to their Research and Development strategy.

The party commissioning the project may be an individual, a small or larger business, or a very large industry sector. For instance, the NZRB has commissioned various projects (see below) to directly increase the possibilities of solving problems or reducing risks which are important to the racing sector. Many people are involved in that sector, so the benefits actually become more public than private. In contrast, an individual or business funding research into, for instance, a specific feed, drug, or on-farm situation most likely would capture the benefit, at least for some time.

Current industry projects

One of the major organisations involved in the partnering is the NZ Racing Board. It has funded 7 different multi-year projects, starting up in the first half of 2007 and all being completed by 2011. In brief, these covered:

- **Causes of foal loss.** Foals dying in the first months of life will be examined carefully and the bacteria they are carrying isolated. This will allow better understanding of the causes of foal loss, more specific treatment protocols for some diseases, and recognition of the current infectious agents which threaten our foals.
- **Herpes virus in foals.** One of the several herpes viruses in foals will be studied to determine if it may be predisposing young horses to serious bacterial respiratory diseases from other causes.
- **Drench resistance.** Research into some of the parasite worms of horses will begin focusing on the problem of resistance of the worms to the drenches used to control them.
- **Greyhound disease and management.** A national survey of greyhound trainers will provide data on what diseases occur in racing dogs, how often they occur, and how they affect racing. This should identify the factors which lead to sub-optimal health in dogs, and how to alter management to minimise or prevent the problems.
- **Reproductive failure in racehorses.** In an attempt to increase production of thoroughbred and standardbred foals, data from many thousands of broodmares will be collected and analysed to determine when breeding failure may be occurring. This will identify the possible causes of production loss, and lead to specific work to correct them.
- **Wastage in the racing industry.** Since the number of racehorses starting races in NZ is not increasing, two projects will concentrate on what is contributing to this wastage. One will examine reasons why many horses sustain arthritis in particular joints, and another will determine if conditioning exercise in young horses, before training begins, has an effect on the success of training later on, by reducing injury rates.

Specifics on details of these research projects is contained under the section on the website Projects Funded.

- **An animal remedies company has funded a large project on a combination medication.** The company wants to know if the medication will reduce lameness in horses afflicted with degenerative joint disease, without causing any side effects in the horses. This multi-centered trial involves practising veterinary clinicians, Massey University staff, and a commercial research company.

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Research Funding

2. Equine Trust funded projects

The Equine Trust concentrates on funding projects based on research grant applications in a two-step process:

1. An Expression of Interest (EoI). These EoI's are then reviewed by the New Zealand Equine Trust Board and a recommendation made for submission of a full length proposal.

2. Full proposals are then considered and funding based on scientific merit as well as relevance of the research. These projects are "public" based on matters of high priority and national importance to more than one part of the equine industry.

Current Equine Trust Projects

Projects funded by the Equine Trust include the following:

- **Manipulation of Connexin43 in tendon lesions**
  Tendon lesions occur commonly in racehorses and frequently destroy prospects for future athletic success. Many treatments have been proposed but not a single one has been shown to be successful. The answer may lie in the early events that occur after the tendon is injured. This project will study those events and determine if manipulating the proteins that connect tendon cells will result in better healing in the tendon.

- **Change in bone and cartilage markers in blood of thoroughbreds in training**
  There are two distinct populations of 2 year old horses in training – one group which goes through training uneventfully and one group which suffers numerous withdrawals. This study aims to develop a panel of biochemical markers of bone and joint cartilage metabolism to determine if the horses that fail to progress have subclinical musculoskeletal problems at the beginning of training.

- **Impact-induced fracture of the equine third metacarpal bone**
  In the athletic horse the lower joint surface of the third metacarpus (the cannon bone) is the most common site of fracture. A widely held view is that frequent high impact loads can produce branching arrays of microcracks in the bone which eventually coalesce leading to catastrophic failure. This study aims to explore how impact-induced microcracks develop including the influence of training and early osteoarthritis.

Teaching & Learning

Associated with the Partnership for Excellence, Massey University is further developing the suite of academic programmes the university offers to those with an interest in the equine industry.

An equine major has been selected as one of only 3 majors in Massey University's new flagship Bachelor of AgriScience degree to be offered from 2009. This three year degree is based on the current Bachelor of Applied Sciences programme (which the B.AgriScience will replace). The equine major has a core of equine-specific courses supplemented by courses drawn from agricultural science, technology and business schedules (all relevant to the equine industries). The overarching goal is to position graduates at the interface of equine science, pastoral agriculture, technology and business so they are capable of leading New Zealand equine enterprises. A process of extramuralisation is underway to provide students the opportunity to study while remaining in employment if that is their preference. For more information please see the 'majors' tab on the following website http://sciences.massey.ac.nz.

A new one year equine diploma will also be on offer from 2009. The diploma is related to the B.AgriScience (equine) degree but is a condensed and focussed offering for students unable to study for a three year degree.

For students interested in equine events-management and equestrian coaching, arrangements have been put in place to allow the incorporation of equine courses within the University's Bachelor of Sport/Exercise degree. This degree places an emphasis on not only the physical fitness and training aspects of the animal but also on coaching, communication, motivation, psychology of the sportsperson, event management, safety, and employment-contractual issues. For more information please see the 'undergraduate programmes' tab on the following website http://business.massey.ac.nz.

Postgraduate opportunities are also available, including masters and PhD programmes focussed on research of relevance to the equine industries. For more information on these opportunities please contact Debbie Hill at Massey University (D.M.Hill@massey.ac.nz)

Research Briefs

As part of a programme to quantify the Thoroughbred production process in New Zealand researchers at Massey University have recently conducted a number of surveys examining feeding, management of thoroughbred racehorses and general stud farm management. In a related project in collaboration with Dr Arpad Bakor from Hungary a mathematical model of foal growth has been developed. These data provide opportunity for the industry to benchmark current practices and measure the impact of new feeding and management strategies on growth and production.

How Thoroughbred racehorses are fed in New Zealand

Data were collected from Thoroughbred racehorse trainers in the Auckland, Waikato and Central districts. The trainers were asked a series of question on the feeding and management of their horses. Faecal samples were taken from a sample of horses to indirectly evaluate any hindgut acidosis associated with a high grain diet.

In contrast to the belief that many New Zealand racehorses are pasture trained, the majority of racehorses surveyed (95%) spent most of their time in stables or yards for more than 12 hrs per day . Fifity three percent of racehorses were fed a combination of grains and commercial pre-mixes, whilst 32 % were fed just commercial pre-mixes and 14 % were fed grain as the only source of concentrate. Horses fed only grains were fed more grain than the other two groups (6.1kg / day vs. 5.1kg / day) and tended to have a faecal pH indicative of some hindgut acidosis (pH 6.2). Irrespectively of the concentrate fed, the feeding of at least 2.25 kg of hay twice per day reduced the number of horses with faecal pH indicative of hindgut acidosis. Therefore it would appear that irrespective of management system it is important to feed at least 2.25 kg of hay/day ad libitum, to buffer hindgut acidosis associated with diets high in soluble carbohydrate.

To view the article published in New Zealand Veterinary Journal

http://www.sciquest.org.nz/?hash=mQgQ

General stud farm management

Data were collected from 22 stud farms located in the South Auckland/Waikato region (n=15) and lower North Island (n=7) of New Zealand, using a face-to-face survey. The stud master provided information on the size, scope and management of the farms during the 2004/2005 breeding season. Analysis was based on the location of the farm and size of the breeding operation (number of resident mares).

The effective farm size ranged from 20 to 526 ha and averaged 167 and 88 ha in the South Auckland/Waikato and lower North Island areas, respectively. The typical farm had 3 stallions and 50 wet mares and 21 dry mares at the time of the survey.

Seventy-one percent of farms aimed to breed dry mares early in the breeding season, and used a combination of lights, hormone therapy, and rising plane of nutrition to achieve this. Foaling took place in foaling paddocks with most farms (77%) using a night foaling attendant and 22% of farms using a foaling alarm.

At birth, 77 % of stud masters routinely administered antibiotics; 64% administered tetanus antitoxin; 41% administered an enema to foals and only 9% did not routinely administer prophylactic treatments. On average, weaning occurred at 5 months of age and on 73% of farms foals were confined to a box for 1–2 weeks. Weaned foals were drenched with anthelmintics every 7 weeks and were fed on average 2.9kg of concentrate feed while at pasture until yearling preparation began,; on average 13 weeks before the sales. Eight farms weighed the weanlings, at least monthly, to monitor growth.

The management of Thoroughbred horses was relatively consistent throughout the regions surveyed. Utilisation of breeding stallions tended to be more efficient on the larger stud farms in the South Auckland/ Waikato region.

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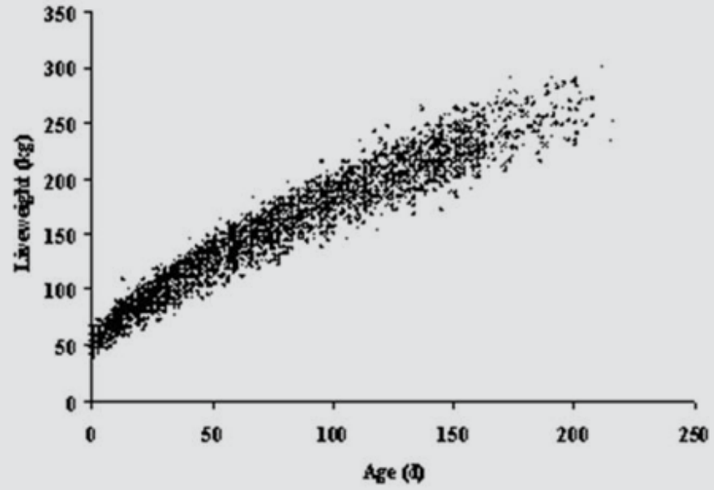

Modelling foal growth

In order to measure the impact management changes have on foal growth it is important to have a growth model to which growth rates and body weights can be compared.

The ability to grow foals successfully with a pasture-based production system is a unique opportunity for Thoroughbred breeders in New Zealand. Therefore, it is important the breeders have access to a growth model that has been developed using data from foals grown under a typical New Zealand production system.

In this study, twice monthly weight records, collected from a thoroughbred stud farm over a 6 year period, were used to model foal growth up to when the foals were weaned. Within this dataset colts and fillies grew at similar rates; the largest impact on foal weaning weight was the age at weaning and the foal's birth weight. The most accurate model of foal growth to weaning was a Brody's equation LW = [b0–(b0–BW) x e(–b1 x age)], and an equation including BW: LW = [((b0 x BW x age) + BWb1)b2], that was developed in this study (b0 is an intercept, b1 and b2 are regression coefficients, and e is the base of natural logarithms). These models describe rapid growth up to the first month and less rapid rate of growth with increasing live weight up to weaning. The typical average daily weight gain of New Zealand Thoroughbred colts and fillies were:

Colt: ADG (kg/day) = 1.819–0.00443 x Live weight

Filly: ADG (kg/day) = 1.896–0.0050 x Live weight

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