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INDUSTRY PROFILE

BASIL NOLAN

QUEENSLAND THOROUGHBRED BREEDERS ASSOCIATION

WHAT’S YOUR BACKGROUND?

I grew up on Raheen Stud, in the Gladfield Valley west of Brisbane, which has been a family-run affair since it was founded by my parents Basil and Rita in 1957.

I enjoyed being part of the breeding and preparing yearlings when I was young, but became a bookmaker for 22 years before starting to concentrate on breeding.

After my father died in 1971, I took over the running of Raheen with the help of my mother and my family.

WHAT MADE YOU GET INVOLVED IN THE QUEENSLAND THOROUGHBRED BREEDERS ASSOCIATION?

I'm passionate about racing and racing's been very good to me.

I joined the Association back in the 1960s because I thought it was the organisation that could better our lot as breeders. I was President from 1980 to 1991 and re-elected again in 2010.

We have faced a lot of challenges, but the main one for the past ten years has been to improve the prize money.

The board has been proactive in lobbying government for a better deal and I think we’re making some traction, with the introduction of a fillies’ bonus scheme this year.

HOW IMPORTANT IS RESEARCH FOR THE THOROUGHBRED INDUSTRY?

Research is vital, and there's a lot to be done.

We've come a long way with breeding, but we're probably only getting 70 per cent of foals per season from our mares, so we definitely need to look at better results of pregnancy and more viable foals.

Otherwise, given the declining number of mares Australia-wide, we'll start to see a decline in the number of starters in races and that will affect the whole industry.

Reducing wastage should be a priority, and we also need to look at the training of horses.

THE INDUSTRY IS CONSIDERING THE INTRODUCTION OF A LEVY. WHAT WILL THAT MEAN FOR QUEENSLAND HORSE OWNERS?

I hope that if the levy is implemented we can make sure there's a focus on industry relevant research.

Breeders here in Queensland are waiting for the levy to be implemented, but they’re already looking at key areas of research so they’re ready to have their say.

RIRDC HORSE PROGRAM ADVISORY COMMITTEE

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RIRDC’S HORSE PROGRAM IS AUSTRALIA’S NATIONAL HORSE RESEARCH AND DEVELOPMENT PROGRAM – DELIVERING SIGNIFICANT BENEFITS BACK TO YOU.

RECENT FUNDING CONTRIBUTORS:
Australian Racing Board through Racing Information Services Australia, Australian Thoroughbred Breeders Club, Australian Stock Horse Society, Equine Veterinarians Australia, Equestrian Federation of Australia, Paint Horse Association, RIRDC.
Racetrack conditions play a major part in both racing performance and the incidence of injuries, but until now there’s been little understanding of the link between the track surface and its effect on horses at training and racing speeds.

The project, funded by the Rural Industries Research and Development Corporation (RIRDC) Horse Program and led by Helen Davies from the University of Melbourne, provides the first measurements of hoof impact on grass, sand and synthetic tracks at medium galloping speed.

The horseshoe technology was developed by two Melbourne-based companies: the consulting and innovations group, SPERERO; and PraxSys, which specialises in electronics design and manufacturing.

They were advised by the University of Melbourne School of Veterinary Science and funded by a Research Collaboration Grant from the University of Melbourne.

Inertial transducers and a strain gauge equipped the shoe to measure three-dimensional accelerations and deformation due to hoof loading, using techniques commonly found in aerospace applications.

The shoe was fitted to a single, fit Thoroughbred horse that was ridden at a range of speeds, from a walk to a gallop, on four different training and racing tracks in the Melbourne region.

Measurements were also made on a range of other surfaces, including bitumen, in order to provide a check of the data processing algorithms.

The analysis showed significantly different characteristics between the different surfaces, as well as different levels of variability within the surfaces.

The sequencing of hoof deceleration and the build-up of limb load also differed between the surfaces.

While the study demonstrated the capability of the method to detect differences in track surfaces under a few test conditions, researchers say this is only the ‘tip of the iceberg’ in terms of application.

With further development and application to a broader range of surface conditions, the in-field method has the potential to provide a standard, comprehensive and rapid tool for use in designing, managing and rating track surfaces.

They say the current shoe design is advanced enough to be transitioned from a prototype to a short run of manufacturing for research-only purposes.

This would dramatically reduce the price of the shoe and allow a more widespread research program to be conducted, in which more conditions could be tested.

The report Measurement of racetrack surfaces using instrumented horse shoes, is available on the RIRDC website www.rirdc.gov.au for download (free) or purchase ($25). RIRDC publication number 13/100.
TAKING THE GUESSWORK OUT OF DRUG COMPLIANCE

Vets and trainers treating sick horses with therapeutic drugs can now consult a handy pocket guide to ensure they comply with regulations for competition.

Detection Times for Equine Medications is the latest product from a five year, $1.3 million dollar study of how long it takes a range of therapeutic drugs to work their way through a horse’s system.

The largest study of its kind in Australia, the project was funded by the Rural Industries Research and Development Corporation (RIRDC) Horse Program and industry stakeholders, after Equine Veterinarians Australia (EVA) called for urgent attention to the matter of detection times.

Evidence shows that seven out of 10 cases of drugs detected in competing horses are actually therapeutic – drugs that have been used to treat a legitimate condition and simply haven’t been excreted from the system at the time of testing.

Until now, vets and trainers have estimated withholding periods using information contained in the EVA ‘White Book’. This provides suggested detection periods for around 60 drugs, but about two-thirds were tested on only one or two horses in ad hoc drug trials at city-based labs.

The latest project involved 20 investigators taking more than 20,000 blood and urine samples, with each test drug administered to groups of 12 horses stabled at the University of Queensland, Gatton and Charles Sturt University, Wagga Wagga.

The effort to provide more accurate excretion times brought together four Universities, four Australian horse...
racing forensic laboratories and the EVA to form a research consortium, Equine Therapeutics Research Australia (ETRA), which consulted industry and identified the 18 most important and commonly used equine medications.

Representatives from peak bodies such as the Thoroughbred and harness racing industries were asked which compounds they needed more information about, and vets were surveyed to see which drugs they most commonly prescribed and how confident they were in the recommended withholding periods.

The 18 compounds administered to horses in the study included corticosteroids, antibiotics, tranquillisers and anti-inflammatory drugs, with the concentration of drugs measured in blood plasma and urine.

Project coordinator, Professor Martin Sillence from the Queensland University of Technology, says the sheer scale of the trials allowed researchers to more accurately determine average excretion times and the variation between horses, increasing the reliability of estimates by 10-fold.

International mathematical modelling expert Professor Ray Boston, from the University of Pennsylvania’s School of Veterinary Medicine, assisted in analysing the data.

Dr Sillence says there were also a few surprises, with some drug interactions including one of the steroids remaining in the horses’ systems for much longer than anticipated, and others not previously thought detectable which showed up on the highly sophisticated testing equipment.

He says the domestic collaboration and the scale of the project has sparked a wider global interest, with new equine drug withholding limits agreed to in southeast Asia and Europe, and the United States now basing some of their regulations on the Australian levels.

He admits there are plenty more compounds of concern, and the group is actively pursuing new laboratory and field-based screening methods. This includes experimenting with advanced technologies such as surface-enhanced Raman spectroscopy, which uses a system of lasers and gold-plated nanoparticles* to detect peptides* and proteins of interest, such as EPO, in samples collected in the field or at the track.

Dr Sillence says researchers decided on publishing a pocket book to ‘get something useful into people’s hands’, and the guide can be updated and reprinted relatively cheaply. Researchers are currently liaising with Equine Veterinarians Australia to develop a smart-phone app to provide similar information.

The pocket guide Detection Times for Equine Medications is available on the RIRDC website www.rirdc.gov.au for download (free) or purchase ($10). RIRDC publication number 13/038.

* see glossary page 8
RIRDC HORSE RESEARCH

While the Rural Industries Research and Development Corporation (RIRDC) Horse Program publishes many of the final reports from research it has funded, this is not always the case. Below is a short summary of some research results where a report has not been published.

MUSCULOSKELETAL INJURY AND CORTICOSTEROID INJECTIONS

Musculoskeletal* injuries are the most common condition that disrupts training of racehorses. Local corticosteroids* are used for the management of orthopaedic* conditions in racehorses and there is potential for musculoskeletal injuries in horses following their use.

This study found that Thoroughbred racehorses continuing to train after receiving local corticosteroid injections suffer musculoskeletal injuries at approximately 4.5 times the rate of horses not receiving treatment.

For horses receiving multiple local corticosteroid injections the rate is approximately twice that of horses receiving single injections.

Whether local corticosteroid injections increase or decrease the risk of injury directly is unknown; more likely these results are due to progression of the musculoskeletal condition that prompted treatment.

Trainers and owners should be made aware of the injury rates following local corticosteroid injection to enable them to better determine how to manage horses with orthopaedic conditions.

Project title: Musculoskeletal injury following local corticosteroid injection in racehorses
Lead researcher: Dr Chris Whitton
University of Melbourne
Email: cwhitton@unimelb.edu.au

DIAGNOSIS AND CONTROL OF SMALL STRONGYLE PARASITES

Intestinal worms called cyathostomins (small strongyles) are considered the most common and pathogenic* of the various parasites that infect horses globally.

Immature parasites may live in cysts in the horse for some time before their mass maturation to larvae can cause serious wasting disease. Adult parasites cause a less serious disease involving ulceration of the intestine.

Current methods cannot detect the immature stages of small strongyles, and diagnosis of adult stages is by microscopic examination of faeces for their eggs. This project found the levels of several proteins differed between uninfected and infected horses. An antibody to one of the proteins has promise as a diagnostic tool.

Horses were also tested for the presence of antibodies to a parasite protein known to be associated with larval disease. This was not able to unequivocally identify horses with larval infection but could detect horses with clinical larval disease.

This research is expected to lead to the development of a validated diagnostic test for larval cyathostominosis*, which could lead to better targeted treatment and reduced use of anti-parasitic drugs.

Project Title: Diagnosis and control of small strongyle parasites of horses
Lead researcher: Prof. Nicholas Sangster
Charles Sturt University
Email: nsangster@csu.edu.au

GENE EXPRESSION IN ROARING HORSES

Recurrent laryngeal neuropathy (RLN) is a disease that affects the upper airways of horses and leads to the characteristic noise known as ‘roaring’.

The disease ranges in severity, making it almost impossible to predict which horses showing early indications of RLN will go on to become roarers.

A single muscle, the cricoarytenoideus dorsalis (CAD), is responsible for opening the airway. Once its nerve supply is lost, so is the normal function of this muscle.

* see glossary page 8
This project looked at gene expression in the CAD to gain a better understanding of why RLN progresses, with the long term aim of identifying which horses showing subclinical signs will progress to clinical disease.

Degeneration of specific CAD muscle fibres occurred in horses with RLN, but the marked variability in gene expression in the CAD muscle of Thoroughbreds made interpretation of data challenging. Further work is required to identify individuals at high risk.

RIRDC title: Gene expression in horses with Recurrent Laryngeal Neuropathy (RLN)
Lead researcher: Liz Walmsley
University of Melbourne
Email: eawa@unimelb.edu.au

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**RISK FACTORS FOR EQUINE HERPESVIRUS-1**

Equine herpesvirus-1 (EHV-1) infections are most commonly associated with late term abortion, perinatal foal deaths and respiratory disease, but can also manifest as the neurological disease, equine herpesvirus myeloencephalitis (EHM).

Since the mid 1990s there has been an increased incidence of significant outbreaks of EHM in the United States and Europe, with high mortality rates and serious disruption of racing schedules and other equestrian events.

Australia has also reported outbreaks of EHM but, unlike the US and Europe, has not reported similar increases in the number of incidents.

The study has proven the hypothesis that modulation of connexin gene expression could alter the balance of collagen protein synthesis in the healing tendon in the critical early stages of repair. Decreasing connexin expression using a blocking agent provided support for the idea that inflammation is present during SDFT injury repair.

An in vitro explant tendon model has also been developed that shows potential as a tool for future research into equine SDFT injury.

Project title: Superficial Digital Flexor Tendon injury in horses: modulation of gap junction expression in healing equine tendon
Lead researcher: John (Dick) Wright
The University of Queensland
Email: j.wright2@uq.edu.au

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**TENDON INJURY IN HORSES**

Superficial digital flexor tendon (SDFT) injury is common in athletic horses.

One of the basic problems is the excessive formation of Type III collagen. This does not have the tensile strength of Type I, which makes up 95 per cent of the collagen present in a normal adult tendon, and leaves the tendon as a whole both weaker and with increased propensity for re-injury.

Multiple gap junction (GJ) connexin genes have been identified and researchers have shown that connexin gene and protein expression was significantly increased in injured compared to non-injured SDFT.

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**CONTACT STRESSES IN THE EQUINE FETLOCK JOINT**

Injuries in racehorses are due to repeated loading of their bones, joints and tendons, but such loading has been difficult to measure in a moving animal.

The fetlock joint is the most common site of musculoskeletal injury and researchers have used computer modelling to calculate loads in the fetlock joint including the supporting tendons and ligaments.

Data was collected using multiple methods: gait analysis of live horses, muscle function studies, three-dimensional imaging of bone and soft tissues, and mechanical loading of the limbs to measure soft tissue properties.

Areas of high load within the joint coincide with common injury sites, demonstrating the importance of understanding limb loading for the prevention and treatment of injury.

Further investigation is needed to understand how these surface loads are transmitted through the subchondral bone where injury originates, and factors that affect loads generated in the important structures of the lower limb.

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Project title: Computational modelling of in vitro contact stresses in the equine fetlock joint
Lead researcher: Dr Chris Whitton
University of Melbourne
Email: cwhitton@unimelb.edu.au

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CURRENT RIRDC HORSE PROJECTS

Short term and future athletic performance of the critically ill equine neonate
Researcher: Jane Axon
Organisation: Scone Equine Hospital

Antimicrobial susceptibility patterns of bacterial isolates from horses
Researcher: Tony Mogg
Organisation: University of Sydney

An adenoviral vector vaccine against Rhodococcus equi
Research: Mary Barton
Organisation: University of South Australia

Working towards a more accurate diagnosis of inflammatory airway disease
Researcher: Cristy Secombe
Organisation: Murdoch University

Laminitis treatment by regional drug delivery to the horse’s foot
Researcher: Chris Pollitt
Organisation: University of Queensland

Use of the guinea pig as a laboratory model for EAFIL (Extension of PRJ-530 and 2592)
Researcher: Judy Cawdell-Smith
Organisation: University of Queensland

Macrocyclic lactone resistance in Australian horses
Researcher: Glen Coleman
Organisation: University of Queensland

Longitudinal cohort study of horse owners
Researcher: Melanie Taylor
Organisation: University of Western Sydney

Development of improved diagnostics and therapeutics for Hendra virus infections
Researcher: Glenn Marsh
Organisation: CSIRO

Spikes in Hendra spillover: early warning through the bat urinary metabolome
Researcher: Michelle Baker
Organisation: CSIRO

Implmenting a national flying-fox monitoring program
Researcher: David Westcott
Organisation: CSIRO

Early detection of Hendra virus infection by microRNA profiling
Researcher: Cameron Stewart
Organisation: CSIRO

Glossary

Corticosteroids – man-made drugs that closely resemble cortisol, a hormone produced naturally by the adrenal glands, and that are used to reduce inflammation to treat autoimmune conditions and to replace naturally occurring hormones.

Cyathostominosis – a disease caused by the rapid emergence of many small strongyles (worms) resulting in weight loss, diarrhoea, and potentially death.

Musculoskeletal – relating to the system of muscles, tendons, ligaments, bones and joints and associated tissues that move the body and maintain its form.

Myelencephalitis – inflammation of the spinal cord and brain.

Nanotechnology – the science and technology of precisely manipulating the structure of matter at the molecular level.

Orthopaedic – relating to the medical treatment of injuries and diseases affecting bones, muscles, joints, and ligaments.

Pathogenic – capable of causing disease.

Peptides – chemical compounds composed of a chain of two or more amino acids, usually smaller than a protein. The amino acids can be alike or different. Many hormones and antibiotics are peptides.

Perinatal – the period during or around the time of birth.

Subchondral – below the cartilage.