RIRDC EQUINE RESEARCH NEWS

Australian Government
Rural Industries Research and Development Corporation

NEWSLETTER OF THE RIRDC HORSE PROGRAM 12/138 DECEMBER 2012

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INDUSTRY PROFILE
BRIAN STEWART

Rural Industries Research and Development Corporation (RIRDC) Horse Program Committee Member, Brian Stewart, has spent twenty years away from home, working overseas in the horse racing industry in Macau, Singapore and Hong Kong. He's been back in Australia for the last year as the Head of Equine Welfare and Veterinary Services for Racing Victoria, and says he is excited by the ongoing potential for equine research in Australia.

Brian Stewart

WHAT'S YOUR BACKGROUND?

I was going to be a cattle vet, but I drifted into racing. I was interested in horses, and racing just seemed to follow on from there.

I graduated with a Bachelor's Degree in Veterinary Science from Melbourne University in 1979, and worked in the local racetrack practice for about ten years.

In the 1980s I went overseas to work at the Macau Jockey Club for a few years, then moved to the Singapore Turf Club as the Chief Veterinary Officer for nine years.

After that I went to Hong Kong to become head of the new Department of International Liaison and Veterinary Regulation.

I returned to Australia after 20 years overseas in December last year, taking up the role of Racing Victoria's Head Veterinarian.

WHAT MADE YOU COME BACK TO AUSTRALIA?

Over the past ten years my career objective has been to achieve a leadership role in the horseracing industry that could provide the opportunity to have a major impact on improving the integrity of the industry and the health and welfare of racehorses.

I believe these issues are fundamental for the survival and growth of the racing industry and require pro-active and sophisticated management.

I want to achieve these objectives by contributing to the development of the Australian horseracing industry, as well as the greater horse industry in Australia.

WHAT SKILLS DO YOU BRING TO THE RIRDC HORSE COMMITTEE?

I feel that I bring extensive industry experience both local and international. My time overseas means I have excellent connections with the racing and equine research industries.

I serve as the Chairman of the International Group of Specialist Racing Veterinarians, a worldwide regulatory and compliance association.

I am also the Chairman of the International Federation of Horse Racing Authorities' (IFHRA) International Movement of Horses Committee, which aims for the free and safe movement of horses.

I am also a member of the IFHRA's Racehorse Welfare Committee

RACING IS OBVIOUSLY AN IMPORTANT PARTNER IN HORSE RESEARCH – HOW DO YOU SEE THEIR RESPONSIBILITY PLAYING OUT?

I see it as very important and something that needs to be promoted and developed within the horse racing industry.

Horse racing, especially at the moment, is particularly focused on horse welfare and safety. Research is essential to ensure the local industry is seen as a leader in these areas.

WHAT ARE SOME OF THE COMMITTEE'S PRIORITIES?

Equine Therapeutics Research Australia (ETRA) is a consortium of three Universities and the four Australian Racing Laboratories, with funding from RIRDC. The primary role of ETRA is to determine the pharmacokinetics of equine therapeutic drugs by using horses of racing ages.

The work that ETRA has done to date is extremely worthwhile, and I believe it needs to be developed and funded further into the future. The work has been received extremely well by industry, and has made us a world leader in terms of service to the racing industry.

I would also like to focus on minimising severe and fatal injuries to horses on the racecourse.

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Dr Brian Stewart
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Dr Dave Alden
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Established Rural Industries
RIRDC

Helen Moffett
Project Manager
RIRDC

HORSE RESEARCH NEWS

HORSE RIDING AND TRANSFER OF WEEDS

Horse riding in national parks and conservation areas is a popular activity for many Australians. However there are concerns about the risk of weeds being transferred into these areas via seeds in horse manure. Management strategies based on practical scientific knowledge are required to promote recreational riding with the minimum impact on natural ecosystems.

A study funded by the Rural Industries Research and Development Corporation (RIRDC) Horse Program and led by Dr Chris Pollitt from the University of Queensland has investigated the viability of weed seeds in horse manure in a glass house trial. It asked the question 'Do horse faeces contain viable seeds which may be germinated under suitable conditions or persist in surface soil?'

Samples of manure were collected from horses in three locations in the Brisbane area and the seeds in the manure were germinated and analysed after 36 days of growth. From this, the number of viable seeds for each manure sample was determined and, where possible, the species identified.

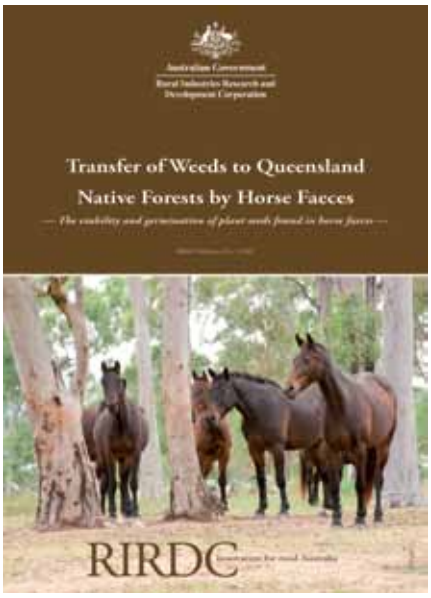
Seedlings of pigweed (centre), emu foot (left fore/centre/ground) and Queensland blue couch

Seedlings at 21 days

This research found that the potential for spread of weed species via horse ingestion is very high. It has broadened the data on the number of herbaceous weed species seeds that can survive in horse manure and also suggests that, in general, seeds of grass species retain viability better than seed of flowering plants after ingestion.

The report recommends that further studies are undertaken to determine the extent that horses contribute to weeds in conservation areas by documenting the weeds found along horse riding tracks and comparing them to the paddock data obtained in this trial.

Management strategies based on empirical data can then be developed by users and caretakers of native vegetation, to minimise weed transfer by horse faeces in areas used for recreational horse riding.



*The report **Transfer of weeds to Queensland native forests by horse faeces** is available on the RIRDC website www.rirdc.gov.au for download (free) or purchase ($25). RIRDC publication number 11/109.*

RIRDC'S HORSE PROGRAM IS AUSTRALIA'S NATIONAL HORSE RESEARCH AND DEVELOPMENT PROGRAM – A PARTNERSHIP BETWEEN INDUSTRY AND GOVERNMENT THAT DELIVERS SIGNIFICANT BENEFITS BACK TO YOU.

CURRENT CONTRIBUTORS: The Australian Government, Australian Racing Board, Racing Information Services Australia, Australian Thoroughbred Breeders Club, Australian Stock Horse Society, Equine Veterinarians Australia, Equestrian Federation of Australia.

RIRDC HORSE RESEARCH

CLIMATE CHANGE — WHAT ABOUT HORSE OWNERS?

How do horse owners feel about climate change? How much do they know? How much preparation for climatic change are they undertaking?

The research project 'Climate Change for Horse Owners,' funded by the Rural Industries Research and Development Corporation (RIRDC) Horse Program and managed by the Horse Federation of South Australia (HorseSA), aimed to discover some answers to these questions.

One of the key problems for horse owners when it comes to climate change and its potential impacts on their horse keeping practices is a lack of information.

This is surprising because, for horse keepers, the quality and availability of pasture grasses, baled hay and manufactured feed, and maintenance of racetracks and sport horse grounds are major areas of potential impact. Without research, development of resource tools and science-led guidance, the horse industry collectively stands to suffer unnecessary economic loss and miss out on market opportunities.

Also, as the distance between the horse keeping populations and capital cities and major regional centres decreases, horse owners are finding that their focus on good environmental practice is necessarily becoming greater. Where horse owners once dwelt in broadacre or rangeland areas, smaller grazing spaces bring sustainability and environmental management into sharp focus.

Horse owners are considering practices to protect drinking water quality and remnant habitats, as well as to respond to neighbourhood concerns about dust, mud and erosion.

Horse owners are increasingly dealing with urban neighbours

If good horse husbandry means creating equine friendly ecosystems, how can horse owners prepare?

HorseSA says as a first step they sought to engage with horse owners and organisations to discuss climate change impacts and the need to develop adaptive practices. A key part of this was to survey the horse community about their practices around, knowledge of and attitudes towards climate change.

Sixty-nine people responded to the survey, the majority from South Australia and Western Australia. They were asked:

- If and how horse keepers have been impacted by any major climate/ weather events in the past 10-20 years
- What action was taken by horse keepers in response to any weather or climate events
- What action horse keepers have been considering taking in the short or long term
- What barriers have prevented those actions
- What horse owner education, research, government policy or other help horse keepers need.

In the survey report, prepared by Dr Kirrilly Thompson, it was noted that while many people shied away from using the term climate change, many people had already made some changes to their horse properties in response to major weather events, including selecting land care actions such as rotational grazing of pastures or protecting waterways with fences.

It also showed emergency events such as fire, flood and cyclone are the highest


FACT SHEET

Climate Change for Horse Owners

concerns expressed by horse owners. This is followed by aspects around horse events including heat stress, biosecurity and insurance.

Following on from this survey a workshop, Horses & Climate Impacts, was held to identify horse keepers' attitudes, practices and knowledge in relation to meeting climate change challenges, identify gaps in research and, importantly, engage horse owners in a way that could lead to a positive approach towards commencement of adaptation measures.

Information and ideas were shared throughout the day which will help the horse industry and community plan for the future.

Jane Myers travelled from Brisbane to share some experiences gained from researching horse keeping practices in the UK and Europe, including a commercial project that recycles stable waste for resale as clean bedding.

The project also included a literature review, conducted by the South Australian Research and Development Institute's Senior Researcher Melissa Rebbeck.

She concluded that disease seems to be the biggest threat to long term horse health.

While much of the literature review relates to disease, it is difficult to predict what insect vectors* will increase and decrease due to temperature and humidity changes. Cyclones and storms that carry these vectors are also difficult to predict.

Participants at the Horses & Climate Impacts workshop. Left to right: Dr Gary Muscatello, John Rothwell, Nicole Halsey, Dr Peter Hayman.

Participants in break out groups discussing priorities for horse owners in relation to climate change. Left to right: John Newton, Aaron Bain, Karen Aspery, Pauline Williams, Jane Myers, Gary Kairn.

The review suggested that other things to consider will be maintenance feeding as pasture is likely to be available for less time due to shorter growing seasons across Australia. Careful planning and track design will be important to reduce both heat stress on horses and heat impact on synthetic tracks.

HorseSA are now in the process of developing an action plan to map out next steps, and are keen to stress the Climate Change for Horse Owners project has been very much a starting point.

HorseSA is keen to hear from anyone who teaches horse care and would be interested in joining an industry collaboration group. Contact *horsesa@horsesa.asn.au*.

The workshop presentations, survey report and literature review have been uploaded to *www.horseslandwater.com*.

*The fact sheet **Climate Change for Horse Owners** is available on the RIRDC website www.rirdc.gov.au for download or purchase (free). RIRDC publication number 12-077.*

RIRDC HORSE RESEARCH

EARLY PARASITE DETECTION NOW A POSSIBILITY

The horse industry is set to gain better tools for diagnosing disease after developing new tests for identifying parasites as part of a Rural Industries Research and Development Corporation (RIRDC) Horse Program research project.

Cyathostomins (also known as small strongyles) are a group of small parasites that live in the large intestines of horses. They are dormant during immature stages but cause a serious wasting disease once the larvae develop, and are considered the most common and pathogenic* of the various parasite species that infect horses globally.

A serious limitation to parasite control is the lack of efficient methods to diagnose the presence of infection and disease aetiology*. Current methods cannot detect the immature stages and diagnosis of adult stages is by microscopic examination of faeces for their eggs.

Improved diagnosis could lead to better targeted treatment and reduced use of anti-parasitic drugs, lowering treatment costs and preserving the utility of these drugs against which resistance is developing.

Researchers hope that in the longer term this research will underpin the development of superior diagnostic tests for infection of horses by adult cyathostomins, benefiting horse owners through improved decision making for parasite control. A diagnostic test to detect larval disease will improve the capacity of veterinarians to provide treatment.

A coiled larva

The research is funded from industry revenue which is matched by funds provided by the Australian Government. In kind contributions were from Charles Sturt University and the Moredun Research Institute (MRI) in Scotland.

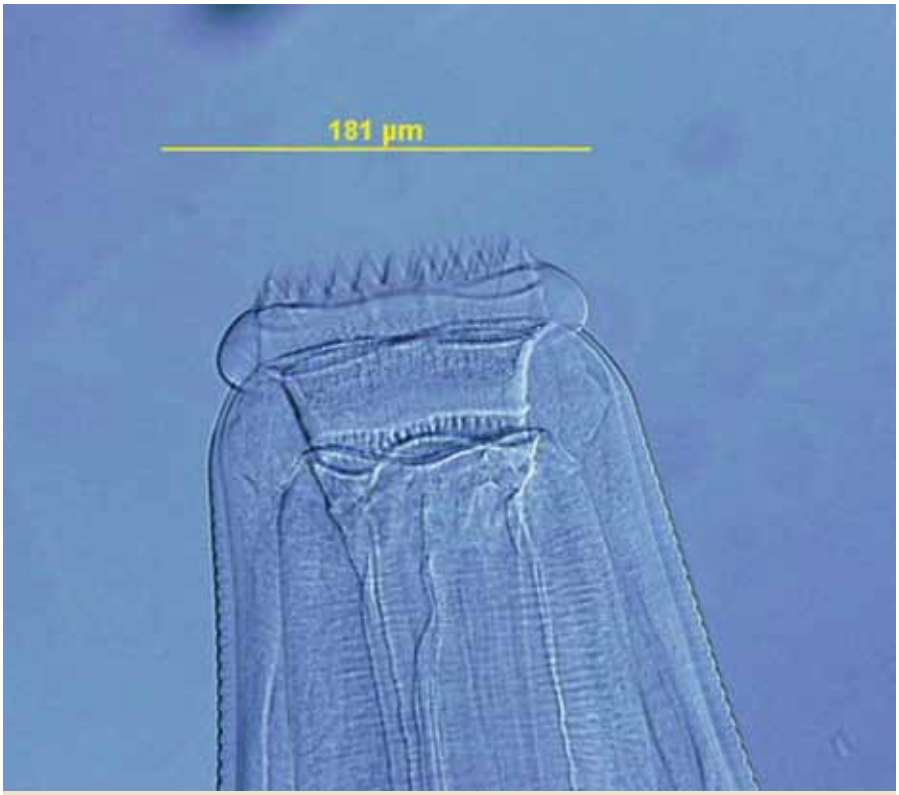
WHERE ARE SMALL STRONGYLES AN ISSUE?

All horses are hosts for parasites and infection with cyathostomins occurs in more than 80 per cent of horses. Horses kept in grazing conditions are at high risk and typically carry higher burdens than stabled horses. Young and old horses are most at risk of disease.

These parasites occur in all climatic zones and all horse owners in all regions of Australia have to treat parasitic infection in their horses.

Patterns in other countries suggest that larval disease is a syndrome of horses kept in cooler climates, but formal studies in Australia are lacking. It certainly occurs in NSW.

Researcher Nicholas Sangster



The head of an adult worm

PROJECT OBJECTIVES

The aim was to use disease markers for parasite infection and develop superior tests to diagnose disease by:

- building a collection of worms, sera* and faeces from a range of infected and uninfected horses
- identifying proteins specifically associated with adult worm and larval infection
- evaluating the potential of biomarkers* as diagnostic proteins and evaluate the feasibility of developing a diagnostic test
- validating proteins identified by MRI collaborators as markers of antibody responses to larval infection in Australian horses.

Forty one horses were examined at post mortem, and in addition to faeces and serum, the worm burdens of adult and larvae parasites were recorded for each. Samples from horses with known infection status were used for the testing.

Inclusion of horses with all four combinations of infection status (adult positive or negative, larval positive or negative) was required to develop and validate tests now and in the future. Researchers also recorded the presence of parasites other than cyathostomins as this would provide a means of checking if cross reactions occur in tests.

IMPLICATIONS

This work has provided a better understanding of cyathostominosis and has identified two biomarkers with diagnostic potential. This will require further work, but the reagents* are now available as a result of the project. There is potential to patent this knowledge.

The project proved the utility of sophisticated protein chemistry coupled with database mining to describe equine proteins associated with disease. This opens opportunities to study a wide range of diseases and to develop equine-specific test reagents.

There is now a functional test for larval cyathostominosis. This test should be commercialised in Australia and Charles Sturt University has the capacity to achieve this under licence from MRI.

While this may start as an experimental tool, it has a place in equine medicine and welfare.

This work opens the future to developing a set of tests each one specific for the various stages of cyathostomins.

Horses with larval cyathostominosis suffer serious weight loss and display oedema*. In the past they have been investigated as welfare cases and availability of definitive diagnosis will improve diagnosis and treatment.

The authors recommend that the larval test should be established in Australia and offered commercially to equine veterinarians.

CURRENT RIRDC HORSE PROJECTS

Maternal metabolic status and the occurrence of OCD in Thoroughbred foals
Researcher: Wayne Bryden
Organisation: University of Queensland

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

The Science of Horse Training: Implications for rider safety and horse welfare
Researcher: Paul McGreevy
Organisation: University of Sydney

Finite element analysis modelling of third metacarpal bone invivo stresses
Researcher: Chris Whitton
Organisation: University of Melbourne

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

Bone repair in thoroughbred racehorses: effects of training and rest
Researcher: Chris Whitton
Organisation: University of Melbourne

Developing training programs to prevent injury in young racehorses
Researcher: Lisa Kidd
Organisation: University of Queensland

The role of kisspeptins in vernal transition management in mares
Researcher: Scott Norman
Organisation: Charles Sturt University

Efficacy of IV and aerosolised recombinant equine TNF-α for treating EIPH
Researcher: Ron Slocombe
Organisation: University of Melbourne

Measurement of Racetrack Surface Using Instrumented Horseshoes
Researcher: Jonathan Merritt
Organisation: University of Melbourne

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

What role does rotavirus play in equine diarrhoea in Australian horses?
Researcher: Sally Symes
Organisation: University of Melbourne

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

Determining forces generated using a padded whip and impacts on the horse
Researcher: Glenys Noble
Organisation: Charles Sturt University

Gene expression in horses with Recurrent Laryngeal Neuropathy (RLN)
Researcher: Liz Walmsley
Organisation: University of Melbourne

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

Targeting blood cell activation and clotting dysfunction in equine endotoxaemia
Researcher: Simon Bailey
Organisation: University of Melbourne

Health and Safety in Australian Racing: Evaluation of Safety Vests
Researcher: Caroline Foote
Organisation: Equine Consulting Services

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

*The report **RIRDC Completed Projects in 2011-12 and Research in Progress at June 2012** is now available on the RIRDC website ww.rirdc.gov.au for download (free) or purchase ($25). RIRDC publication number 12/092*

MORE INFORMATION ON RIRDC HORSE PROJECTS CAN BE FOUND AT www.rirdc.gov.au

GLOSSARY

Aetiology – the cause, set of causes, or manner of causation of a disease or condition.

Biomarker – an indicator of a biological state

Oedema – an excessive accumulation of serous fluid in the intercellular spaces of tissue

Pathogenic – able to cause or produce disease.

Pharmacokinetics – the process by which a drug is absorbed, distributed, metabolized, and eliminated by the body, or the study of this process.

Proteomics – the large-scale study of proteins, particularly their structures and functions.

Reagents – substance or compound that is added to a system in order to bring about a chemical reaction, or added to see if a reaction occurs

Sera – plural of serum

Vectors – a Latin word for carrier; in epidemiology an organism, often an invertebrate arthropod, that transmits a pathogen from reservoir to host.

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ISSN: 1324-759X