RIRDC EQUINE RESEARCH NEWS

Australian Government
Rural Industries Research and Development Corporation

NEWSLETTER OF THE RIRDC HORSE PROGRAM

NOVEMBER 2009

IN THIS ISSUE:

Photo by Agile, Phantom Stealth

INDUSTRY PROFILE
ELIZABETH OWENS

Elizabeth Owens is the newest member of the Rural Industries Research and Development Corporation (RIRDC) Horse Committee. She believes her background in the pleasure horse industry – through 30 years competing in dressage – will give her a unique perspective on research being considered.

Elizabeth Owens

HOW IMPORTANT IS THE NON-RACING SIDE OF THE INDUSTRY?

There are a huge number of people, and horses, involved in non-professional riding clubs and competitions. I recognise they're not significant contributors of funding and therefore can't expect to be the focus of all research, but there are good opportunities for outcomes from racing related research to be applied to the rest of the industry. I want to make sure we capitalise on that as much as possible.

At the same time, the pleasure horse sector needs to be prepared to support research and development. There are a lot of things we still need to know to improve welfare, the long-term soundness of our animals and our enjoyment of them.

Since the Equine Influenza outbreak I think there has been a gradual recognition by many organisations and individuals that they are part of a single industry and that there are a lot of benefits in being able to speak with one voice.

YOU SEE RESEARCH AS VITAL TO THE INDUSTRY. WHY?

I am an animal nutritionist and through this I've had a lot of involvement with other R&D Corporations such as Meat & Livestock Australia, Pork Cooperative Research Centre and the layer hen industry.

I have seen the benefits that come from a strong and focussed research effort and believe it's important for the horse industry to get the most out of the dollars it has to spend.

WHAT IS YOUR BACKGROUND?

I have been employed as an animal nutritionist throughout Australia for more than 20 years, after completing an honours degree in Agricultural Science at the University of Western Australia.

I am a keen dressage rider and through my interest in horses I scored a role as Consulting Nutritionist to the international horses at the World Three Day Event Championships in 1986. I've been a Consulting Nutritionist to Australia's Equestrian team for many years since then.

Elizabeth Owens

I've also been competing in dressage for about 30 years, winning five national dressage titles at FEI level and being part of the Australian Team one year for the FEI Challenge Cup and once as a reserve for a tour of Europe. I am also currently the National Riders' Representative to Equestrian Australia for dressage.

Combined, I think this gives me a good understanding of the challenges being faced by those riding as a hobby as well as elite equestrian athletes. Hopefully I can be a voice for the non-racing, non-professional horse owners who are such a large part of the industry.

It's important for high level riders with an appreciation of the benefits and recognition of the contribution of R&D to put up their hands and get involved.

WHAT ARE YOUR PRIORITIES FOR THE HORSE COMMITTEE?

I am keeping an open mind until I have been to a few meetings and get my head across what the Committee's been doing and why.

While I obviously have an interest in nutrition, this is an area that already attracts a lot of interest from feed manufacturers. We need to focus our efforts on areas which don't necessarily produce a revenue stream for those doing the research and therefore aren't being covered by commercial companies.

RIRDC HORSE PROGRAM NEWS

NOW AVAILABLE

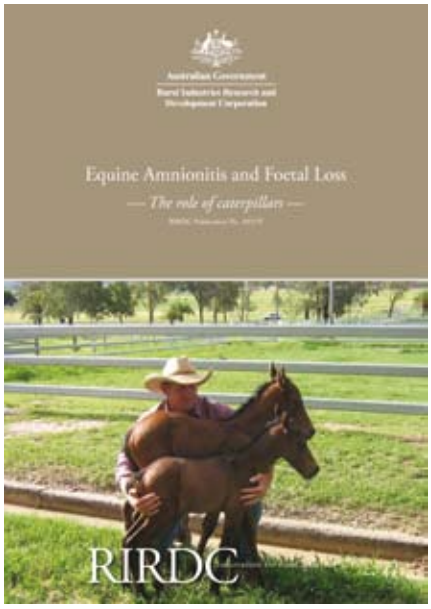
EQUINE AMNIONITIS AND FOETAL LOSS: THE ROLE OF CATERPILLARS

Reproductive loss is a major cause of wastage in the thoroughbred breeding industry and probably accounts for a loss of about 7 – 10% of pregnancies per annum.

In 2004 a series of abortions were described in the Hunter Valley region of NSW that showed an unusual and consistent pattern of clinical and pathological signs. The condition, which came to be known as equine amnionitis* and foetal loss (EAFL), had not been previously reported. The case definition of EAFL showed similarities to descriptions of abortions associated with a condition called mare reproductive loss syndrome (MRLS) reported in Kentucky, USA in 2001 and 2002.

The aim of this RIRDC project was to determine or elucidate the role of caterpillars in the pathogenesis of EAFL, specifically to determine if exposure of pregnant mares to processionary caterpillars (Ochrogaster lunifer) is associated with increased risk of abortion.

A.J. Cawdell-Smith and W.L. Bryden
RIRDC Publication no: 09-155
Available in hard copy ($25) or by download (free)



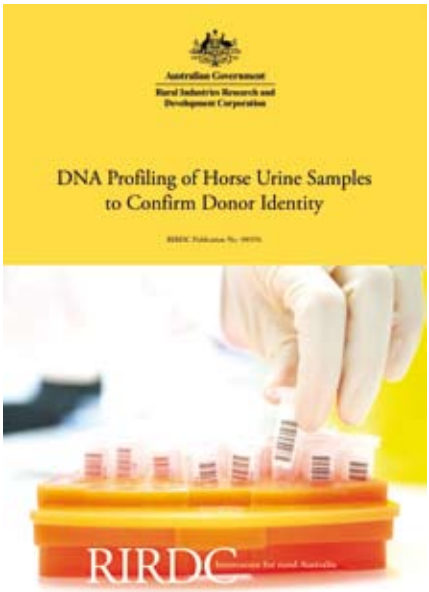
DNA PROFILING OF HORSE URINE SAMPLES TO CONFIRM DONOR IDENTITY

This report examines methods developed to allow urine samples from horses to be independently identified using DNA profile analysis. It is relevant to Australian horse racing authorities and drug testing laboratories, as well as the horse racing, harness racing, turf and jockey clubs across Australia.

The capacity to provide independent and unambiguous confirmation of the identity of the donor of a test sample (whether urine or blood) would be of enormous benefit to the Australian horse racing industry. Drug testing is routinely carried out in race meets, with tests being made for an increasing number of drugs.

The increased efficiency and frequency of drug testing has led to a need for independent confirmation of the identity of a drug-positive urine sample. An accurate DNA test would remove any question of sample substitution.

Paula Hawthorne, Jenny Wang-Holmes, Judy Cawdell-Smith and Ann E.O. Trezise
RIRDC publication no: 09-076
Available in hard copy ($25) or by download (free)



** see glossary on page 8*

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HENDRA VIRUS

PROTECTING YOU AND YOUR HORSE

Since Hendra virus* (HeV) first appeared in Vic Rail's Brisbane racing stables (in Hendra, Queensland) during 1994, it has made national headlines due to the catastrophic outcomes for the horses and humans infected with the disease.

Within a week of that first outbreak, Rail and 13 of his Thoroughbreds were dead.

Since then, 13 outbreaks of HeV have been recorded, eight of these since 2006 – two each year. Seven people are known to have contracted the virus and four of them have died – two within the past 18 months.

The recent cases of HeV in horses and humans have put the disease back in the spotlight and reinforced the need for behavioural change to minimise the risk of HeV infection.

Dr Nigel Perkins, RIRDC Research Manager and author of independent reviews into the HeV outbreaks, said that bio-security* measures are currently the best way to protect both horses and handlers.

"While there have been positive preliminary results from research at the CSIRO Animal Health Laboratory in Geelong on a range of areas including vaccination, post-exposure testing and rapid diagnostic tests, considerable further work is likely to be necessary before products may be available in the field.

"Vaccines take years to develop and pass testing for use, and it is not yet clear whether a commercial entity may be willing to invest in the development of a vaccine," Nigel said.

So far, Queensland has borne the brunt of HeV outbreaks, with the most southern event located near Murwillumbah in NSW.

However, with flying foxes* known to be carriers of the disease and found across northern Australia, and along the eastern seaboard to Melbourne, people in New South Wales and Victoria cannot assume they are safe.

"It is important to know that one of the two people infected with HeV in 2008 is considered likely to have been infected while treating a horse that exhibited no clinical* signs of the disease," Nigel said.

"By the end of 2008, experimental trials conducted in Geelong confirmed that horses infected with HeV can begin to shed the virus before they show signs of clinical illness, with viral shedding increasing as the horses subsequently develop signs and become seriously ill.

"While extremely rare, we all know how deadly this disease is so it's important to protect yourself now, regardless of where you live, with simple bio-security measures when dealing with horses – whether they are sick or healthy," Nigel said.

At the first sign of sickness, isolate horses until the problem has been identified

SYMPTOMS

HeV can cause a broad range of symptoms in horses and should be considered where there is rapid onset of illness, fever, increased heart rate and rapid deterioration associated with either respiratory* or neurological* signs.

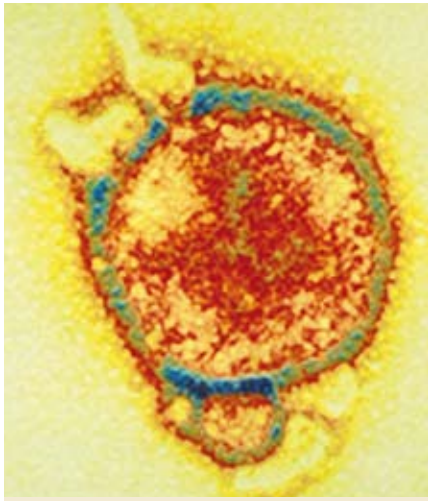

Photo courtesy of CSIRO

This artificially coloured electron micrograph of Hendra virus is from the first identified case in Brisbane in 1994

THE FACTS ABOUT HENDRA VIRUS

- Flying foxes are a natural host for HeV. The spread of HeV from flying foxes to horses is not yet fully understood, but it has been found in the urine, placental material, aborted foetuses and birthing fluids of flying foxes
- There are four species of flying foxes native to Australia, and they can be found from the Northern Territory, all along the eastern seaboard through NSW to Melbourne in Victoria
- There is no evidence of Hendra virus spreading directly from native animals such as flying foxes to people
- All human infections have been the result of very close contact with infected horses, in particular direct exposure to tissues and secretions from infected or dead horses
- Flying foxes often visit properties where native eucalypts, bottlebrushes, lilly-pillies, figs and melaleucas are flowering. Blossoms are their primary source of food, but they will also feed on palm seeds and exotic fruits when native food is less abundant

* see glossary on page 8

Wear protective clothing when in contact with any horses showing signs of an unidentified infection and restrict access to all horses and the property until a diagnosis is made

"General bio-security measures should be a part of the regular daily routine. These should include:

- Thoroughly checking the health of all horses before they enter your property
- Always handling sick horses last and using separate protective clothing and footwear between horses
- At the first sign of sickness, isolating horses until the problem has been identified
- Avoiding direct contact with biological fluid or tissues such as blood, saliva, urine or faeces
- Always washing hands thoroughly with soap and water after contact with biological fluids
- Wearing protective clothing when in contact with any horses showing signs of an unidentified infection and restricting access to all horses and the property until a diagnosis is made

"Everyone who deals with horses should take the time to educate themselves about HeV and be prepared to take adequate precautions depending on the possible risk of exposure to infective material," Nigel said.

For more information, visit the Queensland Department of Primary Industries and Fisheries www.dpi.qld.gov.au.

Hendra virus is a notifiable disease and if suspected, you must call your veterinarian, state or territory government animal health authority or the emergency disease hotline on 1800 675 888.

REDUCING THE RISK TO HORSES

Minimise horses' contact with items that may be contaminated by the body fluids of flying foxes:

- Place feed and water containers under cover
- Don't place feed and water containers under trees
- Don't use feed that might be attractive to flying foxes (apples, carrots or molasses)
- Remove horses from paddocks where flowering trees have resulted in a surge in flying fox numbers
- If removal of horses from paddocks is not possible, try to temporarily remove horses during times of peak flying fox activity (dusk and night time).

REDUCING THE RISK TO HUMANS

People have been exposed to HeV by handling infected horses and not considering HeV at the time. You need to be aware and carefully consider your safety whenever HeV is suspected.

- Treat blood and other body fluids (especially lung and nasal discharges, saliva and urine) and tissue as potentially infectious
- Take precautions to prevent any direct contact with, or splashback of, body fluids
- Protect all exposed skin, mucous membranes and eyes from direct contact and cover cuts and abrasions with a water-resistant dressing

Four species of flying fox are native to mainland Australia

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.

CONTRIBUTORS: The Federal Government, Australian Racing Board, Racing Information Services Australia, Australian Stock Horse Society, Equestrian Federation of Australia, Equine Veterinarians Australia, Racing Victoria, Mr Gerry Harvey of Magic Millions, Logan Livestock Insurance Agency Pty Ltd, International Racehorse Transport, Coolmore Australia, Tyreel Stud, Howard Insurance Australia and Peptech.

CONFERENCE WRAP UP

ISES SYDNEY 2009 ETHICAL EQUITATION - A SUSTAINABLE APPROACH

By Dr Amanda Warren-Smith

Hosted by the University of Sydney and sponsored by RIRDC, more than 200 delegates from 15 countries attended the conference, held in Sydney 11-14 July 2009.

A sustainable approach to equitation is about the need for training systems and competition frameworks that allow horses to have a long working life and reflect the need to protect the environment.

The program of speakers covered themes including behaviour problems, measuring performance, calming and positive reinforcement, welfare, ethology*, competition and education.

DAY 1

The conference kicked off with Professor Leo Jeffcott, the first plenary speaker, who covered 'The role of the event veterinarian in equestrian sport and the importance of research to welfare and athletic performance'. It was enlightening to hear that things can be changed to enhance horses' welfare; changes to the eventing format to manage fatigue as a cause of fatalities on course was an encouraging example.

The program featured four topic areas: behaviour problems; measuring performance; calming and positive reinforcement; and welfare.

Highlights of the day included:

Behaviour Problems

Petra Buckley told how essential it is for veterinarians to have an understanding of behaviour in ridden horses, as this could lead to the conduct of temperament checks at the time of purchase.

Jo Hockenhull and Emma Creighton from the UK suggested that horse owners may need to revise feeding practices to suit their horse's evolutionary requirements, and that the cause of behaviour problems needs to be addressed promptly to prevent them escalating in severity.

Measuring Performance

Anne Barnes concluded that qualitative behavioural assessment could be a useful addition to the evaluation of health and physiological measures of horses competing in endurance events.

Dr Amanda Warren-Smith got into some serious mathematics with some amazing technology that can be used to measure head position and movement, leg movements and rein tension on horses.

Assoc. Prof. Paul McGreevy presented some fascinating points on the laterality* of different species of animals and that improved appreciation of innate asymmetries in horses should prompt appropriate customising of training programs.

Marie Peeters described the use of cortisol* testing via saliva samples, suggesting this as an alternative to blood sampling.

Calming and Positive Reinforcement

Dr Camie Heleski explained how horses' long-term memory was effective when learning a task initially associated with positive reinforcement, refuting concerns that food rewards will continue to be required for performing tasks.

Payana Hendriksen demonstrated that horses undergoing trailer loading with negative reinforcement showed more stress behaviours, avoidance and took longer to complete than those trained with positive reinforcement, although there was no difference in their heart rate.

Dr Machteld van Dierendonck described how equine appeasing pheromone* may hold the potential to be a 'dope-free' way of helping the horse to become accustomed to acute stressors or stressful situations in horses.

Dr Amanda Warren-Smith explained that allowing a horse that has been stirred up to have free interaction with a human will aid in the calming of that horse more than if it was left alone. The importance of this in equitation is that horses' ability to learn is enhanced by calmness.

Welfare

Dr Machteld van Dierendonck informed us that anticipation can be characterised clearly in horses, and, therefore, it can potentially be used as an objective tool to assess welfare of horses, as shown in rats and pigs.

Photo courtesy of Julie Taylor, Epona TV

Brett Parbery and Victory Salute demonstrated methods for objectively measuring performance at the Conference practical sessions.

*see glossary on page 8

DAY 2

Professor Bob Boakes was the plenary and began the day with a fascinating talk on 'Fear, avoidance, and safety signals as rewards'. Bob explained that an animal can learn some forms of avoidance behaviour very rapidly, and subsequent maintenance of that behaviour need not involve continued stress for the animal. He also said that providing very clear and consistent signals can reduce stress during training.

PRACTICAL SESSIONS

Learning Theory in Dressage

This session featured Warwick McLean riding Alessandro and Brett Parbery riding Victory Salute. Of particular interest to most were the red reins and blue boots on the horses, demonstrating the feasibility of objective measures of performance. This enabled the rein tension, head position and leg movements to be recorded while the horse was working.

Showjumping

Colleen Brook, one of Australia's most successful showjumpers and winner of numerous World Championships and World Cup Finals, brought her grey Arab/Clydesdale cross called Dale (pictured below). While first impressions of Dale may not have been that of a super-star, his performances certainly showed that he is. Colleen is motivated by a horse's response to training, always asking if a better job can be done.

(Photo courtesy of Jenny Carroll)

Colleen Brook and Dale

Film and TV work

Steve Jeffries was the next of the practical demonstrators, and began with a video showing some events he has trained horses for, most notably the Opening and Closing Ceremonies of the 15th Asian Games in Doha. The enormity of what the horses were required to do, exacerbated by carrying an inexperienced rider, was absolutely amazing.

Clicker Training

Georgia Bruce (2 x bronze medallist at the 2008 Paralympic Games) showed her proficient use of clicker training with her horse Rhumba. This was a powerful demonstration of how horses can be trained to perform anything without force.

DAY 3

Dr Bidda Jones, Chief Scientist for the RSPCA, was the plenary of the last day and her talk, 'Ethical equitation – what's in it for the horse?', was very powerful and held everyone's interest. Bidda's full report can be viewed on the RSPCA website (www.rspca.org.au).

Ethology and Temperament

Greta Jørgensen presented on the importance of enrichment for horses and highlighted some objects that may be suitable for this.

Bart Bronicki discussed the ethological relevance of round-yard training of horses – a topic that evokes many questions but is still little researched.

Dr Kat Visser described how experts' assessment of temperament in sport horses can be reliable and that perhaps standardised behavioural tests could be used to match individual horses with specific tasks.

Competition

Rachel Hogg informed us that a rider's level of anxiety will not only influence their performance, but also that of the horse.

Inga Wolframm then described how riders should be concentrating on developing their mental skills to help with performance in competitions.

Dr Jack Murphy explained a novel idea for cross country jumps with a view to preventing horse falls when on course.

Education

Sergeant Rebecca Thomas (from the Mounted Police in WA) and Portland Jones explained some of the difficulties of the tasks police horses face and described how their training has been enhanced by the adoption of the principles of learning theory.

Breakout Sessions

After lunch, delegates split into two groups to brainstorm ideas on two big topics:

- How to bridge the gap between the laboratory and the arena
- Identifying and resolving horse welfare issues in training and performance.

These were very positive, with the vibe at the feedback session quite exciting.

Conclusion

Professor David Evans led the conference wrap-up and did a great job tying all the topics of the past three days together, highlighting the importance of research on our beloved horses.

Photo courtesy of Elke Hartman

Georgia Bruce with her horse Rumba showing his great artistic skills

CURRENT RIRDC HORSE PROJECTS

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

Investigation of the mechanism of insulin-induced laminitis in horses
Researcher: Christopher Pollitt
Organisation: University of Queensland

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

In vitro optimisation of conditions for laryngeal reinnervation surgery
Researcher: Eleanor Mackie
Organisation: University of Melbourne

Computational modelling of in vivo contact stresses in the equine fetlock joint
Researcher: Chris Whitton
Organisation: University of Melbourne

Breath sampling for prediction of Rhodococcus equi infection in neonatal foals
Researcher: Catherine Chicken
Organisation: Scone Veterinary Hospital

Investigation of methods for storage of stallion semen at ambient temperature
Researcher: Judy Cawdell-Smith
Organisation: University of Queensland

Histopathology of mares aborting due to Equine Amnionitis and Foetal Loss
Researcher: Judy Cawdell-Smith
Organisation: University of Queensland

Diagnosis and control of small strongyle parasites of horses
Researcher: Nicholas Sangster
Organisation: Charles Sturt University

Alfaxalone anaesthesia in horses: Potential for improved safety for horses
Researcher: Helen Keates
Organisation: University of Queensland

The synchronisation of oestrus and ovulation in the mare
Researcher: Scott Norman
Organisation: University of Queensland

Pathophysiological mechanisms in equine osteochondrosis
Researcher: Eleanor Mackie
Organisation: University of Queensland

Troponin levels in Australian horses
Researcher: Catherine Savage
Organisation: University of Melbourne

Determining reliable excretion rates for therapeutic drugs in horses
Researcher: Martin Sillence
Organisation: Queensland University of Technology

Clostridium difficile-associated disease in horses
Researcher: Thomas Riley
Organisations: University of Western Australia

Pathogenesis of distal limb breakdown injuries in thoroughbred racehorses
Researcher: Chris Whitton
Organisation: University of Melbourne

Intra-articular medication as risk factor for musculoskeletal injury
Researcher: Chris Whitton
Organisation: University of Melbourne

Modulation of gap junction expression in healing equine tendon
Researcher: Janet Patterson-Kane
Organisation: University of Queensland

The role of macrophages in recovery from exercise induced pulmonary haemorrhage
Researcher: Peter Finnin
Organisation: University of Melbourne

Short term and future athletic performance of critically ill equine neonate
Researcher: Jane Axon
Organisation: Axon Veterinary Services

Health and safety in Australian racing
Researcher: Peter V'Landys
Organisation: Racing NSW

Treatment of placentitis in thoroughbred mares: efficacy of altrenogest
Researcher: Joan Carrick
Organisation: Scone Veterinary Hospital

Evaluation of the options for a Horse R&D Levy
Researcher: Greg Martin
Organisation: IDA Economics

Epidemiological investigations into the 2007 Equine Influenza outbreak
Researcher: Navneet Dhand
Organisation: University of Sydney

SCHOLARSHIP TOP-UP

Epidemiological investigations into the 2007 Equine Influenza outbreak
Researcher: Simon Firestone
Organisation: University of Sydney

SCHOLARSHIPS

Kellie Tinworth
Charles Sturt University

Melody de Laat
University of Queensland

Tiffany Dobbs
University of Queensland

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

GLOSSARY

Amnionitis: inflammation of the thin, tough, membranous sac that encloses the embryo or foetus

Bio-security: a set of preventive measures designed to reduce the risk of contamination by biological material

Clinical: able to be observed

Cortisol: the primary stress hormone

Equine appeasing pheromone: a natural or synthetic substance that mimics the natural calming pheromone mares secrete, that soothes and reassures their nursing foals. Horses recognise the smell for life and it can help calm them during stressful situations

Ethology: the scientific and objective study of animal behavior especially under natural conditions

Flying fox: any of a genus (Pteropus, family Pteropodidae) of fruit bats with a foxlike head, living in Africa, Australia, and southern Asia

Hendra virus: a virus, formerly called equine morbillivirus, that can cause illness in horses and humans. First identified in 1994 in Australia where the virus caused the death of two patients, one of pneumonia and the other of encephalitis that developed a year after the patient's initial exposure

Laterality: preference shown for one side of the body over the other

Neurological: relating to the nervous system (brain)

Respiratory: relating to the respiratory system (breathing)

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