International Society for Equitation Science

in association with Companion Animals New Zealand

Presents

19th International Equitation Science Conference

14th – 16th March 2024

A Good Life for horses

Proceedings edited by

Prof. Hayley Randle, Prof. Natalie Waran and Ella Bradshaw-Wiley

Design

H. Randle, Charles Sturt University, Australia

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Views expressed in all contributions are those of the authors and not those of ISES or publisher.

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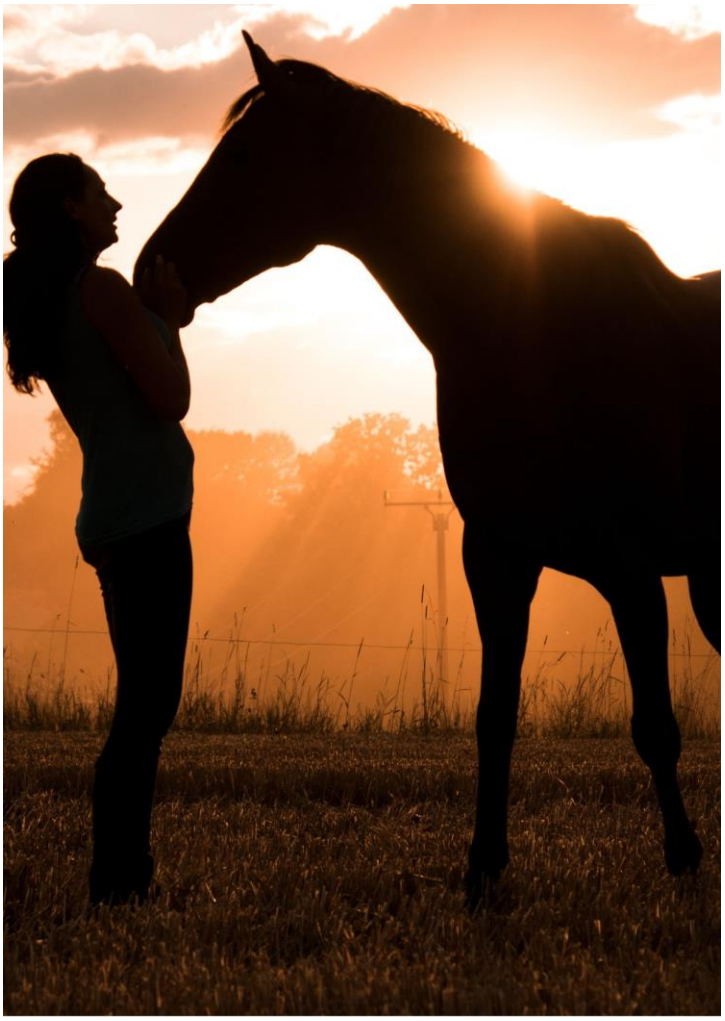
Australia.

International Society for Equitation Science
www.equitationscience.com

The Mission of ISES is to promote and encourage the application of objective research and advanced practice which will ultimately improve the welfare of horses in their associations with humans



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We're keen to hear from everyone attending ISES 2024, so if you can spare 5 minutes to take our short questionnaire we would be grateful.

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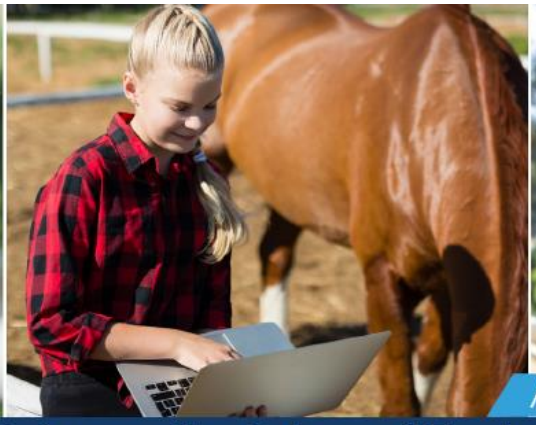


Authored by Dr. Andrew McLean

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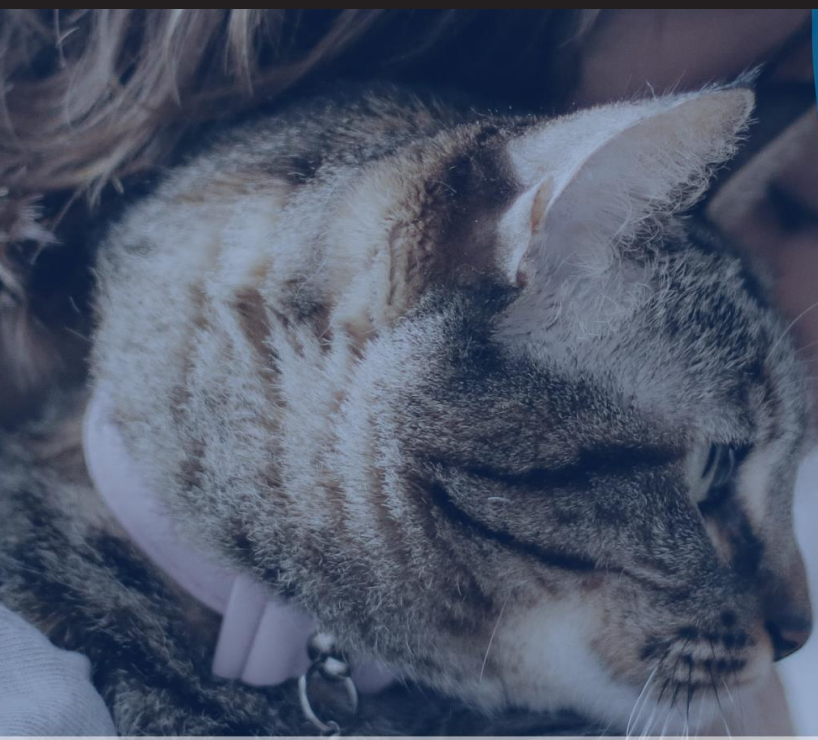

"We apply the science of human behaviour change to achieve positive animal welfare outcomes."

PROFESSOR NAT WARAN
Director - A Good Life for Animals Centre

www.companionanimal.nz

Companion Animals New Zealand is a charity passionate about transforming New Zealand into a global leader in companion animal welfare. Our NZ Companion Animal Register connects more than one million pets with their guardians. Through research and education, we develop effective change programmes and empower pet owners to provide exceptional care, in order for animals to live a Good Life.

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CONTENTS

WELCOME TO NEW ZEALAND AND TO THE ISES CONFERENCE 2024

Nau mai, haere mai, piki mai (Welcome everyone)

I would like to start by expressing our respects to the Waikato-Tainui as *tangata whenua* ('people of the land') of the Waikato region and acknowledging the beauty and hospitality of the special place where our conference is being held. We are delighted to be able to have so many visitors with us here to experience this special region of New Zealand.

I would also like to acknowledge the generosity of our Conference Sponsors without whom we would not be able to run this important gathering. These special organisations have enabled us to keep the registration fee as low as we can to enable as many as possible to join us here, as well as to be able to join us virtually. Please take the time to seek out and thank the representatives from the various organisations who have joined us for the conference, read the material they have provided in the conference bags, and of course, if you are here in person, you can visit their trade stands.

I would also like to thank our venue hosts, Field Day hosts, our AV team and all of the companies/people who have worked with the local organising team to bring you this conference. Of course, the conference would be nothing without the amazing Clever Hans speaker and the session plenary speakers who will be generously sharing their knowledge and passion over the course of the conference, and the researchers who have submitted so many fabulous talks to fill our exciting programme. I also want to thank the many scientists who helped by reading and reviewing the large number of abstracts that were submitted. I am (we all are) indebted to the amazing local conference organising team including the conference support helpers at the event, who have worked extremely hard together to give you the best experience we possibly can. Please join me in thanking each of them for their valuable input.

Finally, I would like to thank all of you for journeying to be with us, or for those who can't be there in person, for being with us virtually - I hope that you will feel that we have put together a worthwhile experience!

Ehara tāku toa i te toa takitahi. Engari, he toa takitini (*Success is not in the work of one, but the work of many)*

This conference marks a significant time in the development of equitation science, and for horse welfare. The field of Equitation Science and the International Society that we subsequently formed, was developed following discussions that took place between a few of the founding members when in Iceland, that led to the first equitation science workshop that was held at Edinburgh University's Veterinary School in September 2004. This was just before I left Edinburgh to live and work in New Zealand, and so it is of particularly significance to me that now 20 years on from hosting that first small gathering, we are here in New Zealand to recognise how far we have come together as equitation scientists, practitioners, and equine organisations.

At a time when public interest in the welfare of animal athletes is higher than it has ever been, the past and future contribution of equitation science is more important than ever. We know that maintenance of the social license for equestrian sport is dependent not only upon optimizing equine welfare including timely responses, but also on transparently and effectively communicating to all involved, including the wider public, about the ways in which this can be achieved. Whilst perception and reality may not always align, there is a need through the lens of equitation science, to understand the significance of issues experienced by horses and address concerns about the way that humans interact with them whether in sport or leisure.

The ISES NZ 2024 conference will play an influential role in helping to elucidate what we currently know, and further the discourse, through bringing together researchers and practitioners from different sectors within the equestrian community and across the world all with the aim of ensuring all horses experience A Good Life. Over the course of the few days we are together in New Zealand (or joining online), through formal presentations and active listening and discussion we will consider the latest research evidence, gaps in our knowledge, opportunities for research and barriers to uptake. We hope that the reach provided by all in the conference room and those joining online will extend beyond this conference to positively influence all of those who have a vested interest in ensuring that we can continue to enjoy our interactions with horses – and know that they can also enjoy their interactions with us.

For those not familiar with New Zealand traditional custom, it's usual protocol (Tikanga (tee-kah-ngah)) to welcome our manuhuri (visitors) to an event through a pōwhiri (formal Māori welcome) or mihi whakatau (see below for explanation). One of the important core values of Māoridom loosely be described as 'hospitality' is Manaakitanga, our duty of care, to look after, feed and respect you as our valued visitors. Māori believe that manaakitanga extended will in time be manaakitanga received. We sincerely hope that you know how welcome you are to this event and you enjoy all of our hospitality during your stay with us. Be sure to make the most of this unique opportunity, and I look forward to hearing the loud buzz of constructive discussions throughout the science programme, field day and of course all the social intercourse in between (and beyond).

On behalf of the Local Organising Committee, Conference Sponsors and all of our venue hosts and helpers,
Haere mai! Welcome to all of you - old friends and new!

Ngā mihi nui

Nat 

Prof. Nat Waran
Professor Nat Waran (As Chairperson, Local Conference Organising Committee)

NOTES:

Pōwhiri/mihi whakatau
The traditional Māori welcome extended to visitors is often called a pōwhiri (which can also be spelt as pōhiri). It literally means to beckon or wave at somebody. When it is conducted on a marae (a Māori meeting place which often consists of a wharenui (a meeting house) and a wharekai (a dining house/hall) there is a procedure that is normally followed. On some occasions the visitors might be challenged (a wero or taki) by one or more warriors brandishing taiaha (a type of staff weapon). A twig or leaf will be laid in front of the visitors. One of the visitors will pick it up to signal that they have come in peace. They will then proceed on to the grounds of the marae and the local women will call them on to the marae – this is called a karanga.

International Society for Equitation Science
www.equitationscience.com

PRESIDENT'S WELCOME TO ISES 2024

Welcome to the 19th Equitation Science Conference! Welcome to New Zealand, or *Kia Ora* as I am learning! Those of you who have attended an International Society for Equitation Science (ISES) conference before know what is in store for you. For those of you who are attending an ISES conference for the first time, prepare yourself for the exhilarating days ahead. Unlike other scientific conferences, you don't need to be a scientist to participate. However to help the non-scientists feel more at home, the conference proceedings provides both a glossary and a quick guide to statistics to briefly explain what "p-values" are all about. Indeed, one of the main drivers of ISES's work is to provide objective, evidence-based knowledge to the end user – the equestrian practitioner – at all levels. To facilitate this, each scientific abstract is accompanied by a Lay Persons Message to clearly communicate the main results.

I have been looking forward to this conference since I hosted the 15th Equitation Science conference in Guelph, Canada in 2019. Remember the time pre-pandemic? Like the rest of the world, ISES switched to virtual conferences in 2020 and 2021. Hartpury University in England resumed our in-person conferences again in 2022, but I was unfortunately unable to attend. And since we are now in the southern hemisphere for the New Zealand conference, we have shifted from the usual month of August to the summer months here.

While the last conference focused on Performance, Practice and Positive Partnerships, this year's conference theme continues in the direction of good equine welfare: "A Good Life for Horses". What makes a good life for horses? It is not only thoughtful approaches to training, feeding and housing with careful consideration to positive mental states to facilitate appropriate horse behaviours, but we must also pay attention to public views of equine welfare and be able to justify our practices with evidence-based research. The Local Conference Organising Committee (LCOC) has put together a fantastic program where we can immerse ourselves in learning, discussing and understanding why a good life is necessary for horses, what a good life for horses looks like and how we can provide this.

We will have two days filled with research presentations and plenary talks covering topics from riding and training to sustainable and ethical practices. In between we will enjoy a field day with visits to a variety of equestrian facilities to stimulate discussion and networking. I am sure we will all come away inspired and invigorated to continue the progression of a good life for our horses.

On behalf of the entire ISES council, I would like to extend my gratitude to the LCOC for all their hard work putting this conference together. I know Natalie Waran and Hayley Randle are seasoned conference organizers so I am confident your every need has been thought of and the program has been carefully curated for maximum learning. Enjoy the conference, but while you are here I challenge each of you to introduce yourself to someone you have never met before, and, through discussion, find some common ground between you. It shouldn't be difficult as we are all gathered together for the love of the horse.

Prof. Katrina Merkies

Katrina Merkies, Honorary President, ISES

ISES 2024 LOCAL CONFERENCE ORGANISING COMMITTEE (LCOC)

Prof. Natalie Waran *LCOC Chair* (Companion Animals New Zealand, New Zealand)
Prof. Hayley Randle *LCOC Co-Chair & Scientific Committee Chair* (School of Agricultural, Environmental and Veterinary Sciences, Charles Sturt University, Australia)
Bridget Dougherty *Chair of Practical Committee* (Capabuild, New Zealand)
Leigh Wills *Field Day Co Chair and venue host liaison* (Foal NZ & Winning Form, New Zealand)
Julie Malcom *Chair of venue management and catering* (Ridewell, Trainwell, New Zealand)
Ella Bradshaw-Wiley *Conference secretary & marketing* (School of Agricultural, Environmental and Veterinary Sciences, Charles Sturt University, Australia)

Other LCOC members with specific responsibilities

Prof. Chris Rogers (Massey University, New Zealand)
Jodie Hartstone (Hartstone Equestrian, New Zealand)
Dr Ina Dragonova (Massey University, New Zealand)
Dr Kylie Legg (Massey University, New Zealand)
Sally King (Foal NZ, New Zealand)

Chloe Campbell *Website and social media* (ISES)
ISES conference Support Crew (the helpers in green!)

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Leigh Wills (Winning FORM & Foal NZ, New Zealand)
Julie Malcolm (Ridewell Trainwell, New Zealand)
Dr Ina Draganova (Massey University, New Zealand)
Dr Kylie Legg (Massey University, New Zealand)

PRACTICAL DAY FACILITATORS (LCOC)

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Julie Malcolm (Ridewell, Trainwell, New Zealand)
Dr Ina Draganova (Massey University, New Zealand)
Prof. Chris Rogers (Massey University, New Zealand)
Prof. Natalie Waran (Companion Animals NZ, New Zealand)

PRACTICAL DAY FACILITATORS (Non-LCOC)

Cristina Wilkins (University of New England, Australia)
Dr Rachel Annan (University College Dublin, Ireland)

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Ella Bradshaw-Wiley (Charles Sturt University, AUS)
Jane Williams (Hartpury University, U.K.)
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Assoc. Prof. Jane Williams (Hartpury University, U.K.)
Prof. Chris Rogers (Massey University, New Zealand)
Prof. Katalijne Visser (Aeres University, The Netherlands)
Prof. Hayley Randle (Charles Sturt University, Australia)
Prof. Natalie Waran (Companion Animals NZ, New Zealand)

STUDENT AWARDS COORDINATORS

Colleen Brady (Purdue University, U.S.)
Uta König von Borstel (Giessen University, Germany)

THE ISES 10 TRAINING PRINCIPLES

Human and horse welfare depend upon training methods and management that demonstrate:

1.Regard for human and horse safety

- Acknowledge that horses' size, power and potential flightiness present a significant risk
- Avoid provoking aggressive/defensive behaviours (kicking /biting)
- Ensure recognition of the horse's dangerous zones (e.g., hindquarters)
- Safe use of tools, equipment and environment
- Recognise the dangers of being inconsistent or confusing
- Ensure horses and humans are appropriately matched
- Avoid using methods or equipment that cause pain, distress or injury to the horse

"Disregarding safety greatly increases the danger of human-horse interactions"

2.Regard for the nature of horses

- Ensure welfare needs: lengthy daily foraging, equine company, freedom to move around
- Avoid aversive management practices (e.g. whisker-trimming, ear-twitching)
- Avoid assuming a role for dominance in human/horse interactions
- Recognise signs of pain
- Respect the social nature of horses *(e.g. importance of touch, effects of separation)*
- Avoid movements horses may perceive as threatening (e.g., jerky, rushing movements)

"Isolation, restricted locomotion and limited foraging compromise welfare"

3.Regard for horses' mental and sensory abilities

- Avoid overestimating the horse's mental abilities *(e.g. "he knows what he did wrong")*
- Avoid underestimating the horse's mental abilities *(e.g. "It's only a horse…")*
- Acknowledge that horses see and hear differently from humans
- Avoid long training sessions (keep repetitions to a minimum to avoid overloading)
- Avoid assuming that the horse thinks as humans do
- Avoid implying mental states when describing and interpreting horse behaviour

"Over- or underestimating the horse's mental capabilities can have significant welfare consequences"

4.Regard for current emotional states

- Ensure trained responses and reinforcements are consistent
- Avoid the use of pain/constant discomfort in training
- Avoid triggering flight/fight/freeze reactions
- Maintain minimum arousal for the task during training
- Help the horse to relax with stroking and voice
- Encourage the horse to adopt relaxed postures as part of training (e.g. head lowering, free rein)
- Avoid high arousal when using tactile or food motivators
- Don't underestimate horse's capacity to suffer
- Encourage positive emotional states in training

"High arousal and lack of reinforcement may lead to stress and negative affective states"

5.Correct use of habituation/desensitization/calming methods

- Gradually approach objects that the horse is afraid of or, if possible, gradually bring such aversive objects closer to the horse (systematic desensitization)
- Gain control of the horse's limb movements (e.g., step the horse back) while aversive objects are maintained at a safe distance and gradually brought closer (over-shadowing)
- Associate aversive stimuli with pleasant outcomes by giving food treats when the horse perceives the scary object (counter-conditioning)
- Ignore undesirable behaviours and reinforce desirable alternative responses (differential reinforcement)

- Avoid flooding techniques (forcing the horse to endure aversive stimuli)

"Desensitization techniques that involve flooding may lead to stress and produce phobias"

6.Correct use of Operant Conditioning

- Understand how operant conditioning works: i.e. performance of behaviours become more or less likely as a result of their consequences.
- Tactile pressures (e.g. from the bit, leg, spur or whip) must be removed at the onset of the correct response
- Minimise delays in reinforcement because they are ineffective and unethical
- Use combined reinforcement (amplify pressure-release rewards with tactile or food rewards where appropriate)
- Avoid active punishment

"The incorrect use of operant conditioning can lead to serious behaviour problems that manifest as aggression, escape, apathy and compromise welfare"

7.Correct use of Classical Conditioning

- Train the uptake of light signals by placing them BEFORE a pressure-release sequence
- Precede all desirable responses with light signals
- Avoid unwanted stimuli overshadowing desired responses (e.g. the horse may associate an undesirable response with an unintended signal from the environment)

"The absence of benign (light) signals can lead to stress and compromised welfare"

8.Correct use of Shaping

- Break down training tasks into the smallest achievable steps and progressively reinforce each step toward the desired behaviour
- Plan training to make the correct response as obvious and easy as possible
- Maintain a consistent environment to train a new task and give the horse the time to learn safely and calmly
- Only change one contextual aspect at a time (e.g. trainer, place, signal)

"Poor shaping leads to confusion"

9.Correct use of Signals/Cues

- Ensure signals are easy for the horse to discriminate from one another
- Ensure each signals has only one meaning
- Ensure signals for different responses are never applied concurrently
- Ensure locomotory signals are applied in timing with limb biomechanics

"Unclear, ambiguous or simultaneous signals lead to confusion"

10.Regard for Self-carriage

- Aim for self-carriage in all methods and at all levels of training
- Train the horse to maintain:
  - gait
  - tempo
  - stride length
  - direction
  - head and neck carriage
  - body posture
- Avoid forcing any posture
- Avoid nagging with legs, spurs or reins i.e. avoid trying to maintain responses with relentless signaling.

"Lack of self-carriage can promote hyper-reactive responses and compromise welfare"

INTERNATIONAL SOCIETY FOR EQUITATION SCIENCE
NEW ZEALAND
A GOOD LIFE FOR HORSES
2024

SCIENTIFIC PROGRAMME

13th March 2024

From 5pm	Registration
	'Greet and Grazing' at Good Union, 98 Victoria St., Cambridge

14th March 2024

DAY 1 The fundamentals of providing a Good Life for horses sponsored by Equitation Science International

Don Rowlands Centre, Lake Karapiro

Presenting authors are underlined

8.00		Registration
8.45		Welcome and introduction
		Mihi whakatau (Traditional Māori Welcome)
		Karakia
		ISES Hon. President welcome Prof. Katrina Merkies
		ISES 2024 Conference Chair welcome & housekeeping Prof. Natalie Waran
		Conference sponsors welcome
9.30		**CHL Clever Hans Lecture sponsored by Hartpury University** NOT JUST WHAT DO WE KNOW, BUT HOW DO WE KNOW IT? DIFFERENT WAYS OF UNDERSTANDING HORSES AND EQUESTRIANISM. Professor Craig Johnson C.B.Johnson@massey.ac.nz
10.15		Morning coffee
Theme 1 Living A Good Life sponsored by Companion Animals New Zealand		
Chair Professor Katrina Merkies		
10.45	PL1	"A GOOD LIFE FOR HORSES" - WHY WE SHOULD BOTHER AND HOW ONE CAN ADVOCATE Prof. Paul McGreevy paul.mcgreevy@sydney.edu.au
11.15	RP1	MONITORING THE CUMULATIVE USE OF HORSES WORKING IN EDUCATION: MOVING TOWARDS ACHIEVING A GOOD LIFE Lindsay Skyner, Skye Wassens, Anna Dennis and Hayley Randle lskyner@csu.edu.au
11.30	RP2	A GOOD LIFE FOR HORSES: HOW USEFUL ARE PHYSIOLOGICAL MEASURES OF STRESS IN THE FIELD? Karly Liffen, Cathrynne Henshall, Jessica Rose and Hayley Randle kliffen@csu.edu.au
11.45	RP3	DELIVERING A GOOD LIFE FOR RACEHORSES - DEVELOPMENT OF A PRACTICAL WELFARE ASSESSMENT PROTOCOL Rachel Annan

		Rachel.annan@ucd.ie
12.00	RP4	TOWARDS THE VISION OF A GOOD LIFE FOR HORSES: A SUMMARY OF THE WORK OF THE FEI APPOINTED EQUINE ETHICS AND WELLBEING COMMISSION Natalie Waran nat@companionanimals.nz
12.30	Lunch	
	Posters-as-a-slide on loop	
	PAS1	REPORTED AGONISTIC BEHAVIOURS IN DOMESTIC HORSES CLUSTER ACCORDING TO CONTEXT Kate Fenner, Bethany Wilson, Colette Ermers and Paul McGreevy kate.fenner@uq.edu.au
	PAS2	SOUND ENRICHMENT EFFECTS ON THE WELFARE OF STABLED HORSES Chloe Bolanos, Essam Mahmoud Abdelfattah, Susan Keen and Amy K. McLean cibolanos@ucdavis.edu
	PAS3	THE COMPARATIVE EFFECTS OF THREE ENRICHMENT ITEMS ON THE PHYSIOLOGY AND BEHAVIOR OF STALLED HORSES (*EQUUS CABALLUS*) Miranda Brauns, Ahmed Ali and Amy McLean mgbrauns@ucdavis.edu
	PAS4	CAN DIFFERENTIAL REINFORCEMENT OF AN INCOMPATIBLE BEHAVIOR DURING MOUNTING IMPROVE RIDER SAFETY AND EQUINE WELFARE? Angelo Telatin, Aliyah Sjoberg and Elizabeth Greene angelo.telatin@delval.edu
	PAS5	A GOOD LIFE FOR HORSES: TEACHING HORSE OWNERS ABOUT DISEASE TRANSFER AND PREVENTION Deborah Reed, Renee Carstens, Deidre Avery, Kris Hiney and Elizabeth Green dlreed@arizona.edu
	PAS6	EVALUATION OF WHIP USE IN THE CROSS-COUNTRY PHASE OF FEI EVENTING COMPETITIONS Victoria Lewis, Luciana Rabaiotti, Emily Legge, Lorna Cameron, Heather Cameron-Whytock and Jane Williams victoria.lewis@hartpury.ac.uk
Theme 2 Riding and Training, Tack and Equipment sponsored by University of Guelph		
Theme 2 Chair Associate Professor Jane Williams		
13.30	PL2	EVIDENCE-BASED HORSE TRAINING Dr Andrew McLean andrewmclean@esi-education.com
14.00	RP5	THE EFFECT OF NOSEBAND TIGHTENING ON EYE TEMPERATURE AS A MARKER OF STRESS Orla Doherty, Richard Conway, Paul McGreevy, Sean Arkins and Vincent Casey orladoherty@live.ie
14.15	RP6	HARNESS RACING THROUGH THE LENS OF ANIMAL WELFARE SCIENCE: REIN TENSION AND PERCEIVED DRIVEABILITY Elke Hartmannm , Anna Byström, Malin Connysson, Mette Pökelmann, Magnus Karlsteen, Paul McGreevy and Agneta Egenvall elke.hartmann@slu.se
14.30	RP7	ORAL CONFLICT BEHAVIOUR IS A POTENTIAL INDICATOR OF ORAL LESIONS IN DRESSAGE HORSES Janne Winther-Christensen and Mette Uldahl jwc@anivet.au.dk

14.45	RP8	EQUINE LEARNING BEHAVIOUR – ANALYSIS OF EQUESTRIANS´ KNOWLEDGE LEVEL Sarah Marlene Lojewski, Vivian Gabor, Sarah Kühl, Sarah Hölker and Uta König von Borstel Sarah.lojewski@agrar.uni-giessen.de
15.00	Afternoon tea	
Theme 3 The Emotional Life of the Horse sponsored by World Breeding Federation for Sport Horses		
Theme 3 Chair Professor Chris Rogers		
15.30	PL3	DETECTING POSITIVE EQUINE EMOTIONS TO ASSESS QUALITY OF LIFE Dr Cathrynne Henshall chenshall@csu.edu.au
16.00	RP9	VALIDATION OF A QUALITATIVE BEHAVIOUR ASSESSMENT (QBA) METHOD WITH QUANTITATIVE BEHAVIOURAL TESTS Marie Rowland, Cynthia Naydani, Jessica Willcox, Valle Sanchez-Izquierdo, Tamsin Coombs, Francoise Wemelsfelder, Cathy Dwyer and Gemma Pearson Gemma.pearson@ed.ac.uk
16.15	RP10	EFFECT OF HAY FEEDING REGIMEN (RESTRICTED, LOOSE HAY FEEDING VS. HAY OFFERED AD LIBITUM IN HAY NETS) ON HORSES' EMOTIONAL STATE AS ASSESSED IN A JUDGMENT BIAS TASK Uta König von Borstel, Desiree Brucks and Franziska Fröhlich uta.koenig@agrar.uni-giessen.de
16.30	RP11	WORKING TO REACH CONSENSUS ON THE TERMINOLOGY OF NASAL-BASED ACOUSTIC SOUNDS IN HORSES AND THE AFFILIATED EMOTIONAL STATES THEY REPRESENT Chloe Young, Camie Heleski, Mackenzie Rockefeller, Kaleb Dempsey and Michael 'Mick' Peterson ChloeYoung@uky.edu *With audience participation*
Lightening talks for Day 1 The fundamentals of providing a Good Life for horses		
16.45	LT1	AN INVESTIGATION EXAMINING SYMMETRY OF RIDING SCHOOL HORSES AND COMPETITION HORSES SADDLES Greta-Marie Jaurenik, Lorna Cameron, Jane Williams and Victoria Lewis victoria.lewis@hartpury.ac.uk
	LT2	ASSESSING RESPIRATORY PATTERN CHANGES USING A MICROPHONE AT HIGH-SPEED TROT IN STANDARDBRED TROTTERS A PILOT STUDY Rhana Aarts, Jeanne Parmentier and Filipe Serra Braganca r.m.aarts@uu.nl
	LT3	RESPIRATORY RATE DETECTION USING NON-CONTACT INFRARED THERMOGRAPHY IN HORSES AT REST Rhana Aarts, Famke Kooij and Filipe Serra Braganca r.m.aarts@uu.nl
	LT4	A NEW REVERSAL LEARNING TEST FOR HORSES Mira Hämäläinen, Iina Brotherus, Tuire Kaimio, Laura Hänninen, Heli Suomala, Anna-Mari Olbricht and Anna Mykkänen mira.hamalainen@helsinki.fi
	LT5	INTERPRETATION OF EQUINE AFFECTIVE STATES: AN EXPLORATION OF CONSISTENCY Amber Wells, Kris Hiney and Colleen Brady amber.wells10@okstate.edu
	LT6	INTERPRETING AFFECTIVE STATE: CAN WE AGREE? Amber Wells, Kris Hiney and Colleen Brady khiney@okstate.edu
17.05	Day 1 wrap up & arrangements for Day 2 Field day Cristina Wilkins short overview of Five Domains for Field day	
	'Mix-and-meet muster'	

DAY 2 (Field day) A Good Life for horses – putting the theory into practice

15th March 2024

Cambridge

Field day sponsored by The Hong Kong Jockey Club

'Off the bit' sundowner event sponsored by NZ Thoroughbred Racing

The 'field' day involves visits to a range of equestrian organisations around Cambridge, the heart of horse breeding and racing in New Zealand. We are grateful to these organisations who are opening their doors to give us insight into their operation and how they approach a Good Life for the horses in their care.

Our field day will help us develop our collective understanding of the assessment of a Good Life in relation to the different life experiences of horses.

Our field day experience starts with the morning at Cambridge Stud and then groups will split up and go to either EventStars and Takapoto Showjumping, or Riding for the Disabled and Pike Racing. We finish with an informal social event where we get a chance to come together and share our experiences and insights about what we have learnt.

Timetable

08:15	Please arrive at bus pickup point at Victoria Square, Cambridge
08:30	Buses depart
09:00	Cambridge Stud experience
12:30	Lunch on the run and bus to next venue
13:00	Group 1 – Riding for Disabled experience Group 2 – EventStars experience
14:10	Bus to next venue
14:30	Group 1 – Pike Racing experience Group 2 – Takapoto Showjumping experience
15:45	Buses return to bus drop off point at Victoria Square, Cambridge
16:00	'Off the bit' sundowners drinks and nibbles at Cambridge Community Pavilion *Tickets are required for this event*
18:30	Evening function ends (approximately)

Field day experiences

Cambridge Stud

This world-class facility has been at the forefront of horse breeding and racing since it was established in 1976 by Sir Patrick and Lady Justine Hogan. It is owned by Brendan and Jo Lindsay since 2018 who have continued to develop the stud, including the Heritage Centre that delegates will visit on the field day.

There are two components to the Cambridge Stud field day experience:
1. A tour and visit to the Heritage Centre led by Cambridge Stud staff and Prof. Natalie Waran
2. Educational sessions led by Leigh Wills and the Foal NZ team.

Morning tea and a 'pack and go' lunch will be provided.

EventStars

EventStars was founded by Gina Lee Schick over 15 years ago and is New Zealand's largest Thoroughbred rehoming operation. She recognised the versatility and trainability of Thoroughbreds on and off the track and sought to assist in solving the issue of the high number of racehorses retiring each year without homes and to provide affordable horses for sport and leisure riders. The facility rehomes up to 300 horses a year and this includes horses repatriating from racing in Hong Kong.

This experience will be facilitated by Julie Malcolm with support from Dr Ina Draganova.

Takapoto Showjumping

Team Takapoto is an elite showjumping breeding and training centre. Their goal is to uplift the showjumping scene in New Zealand. Team Takapoto is part of Takapoto Estate, owned by philanthropists Mitch and Kate Plaw. The stunning Takapoto Estate grounds are on the waterfront of Lake Karapiro, where they have planted nearly a million natives, encouraging birdlife and other creatures back to the area. The showjumping yard, which we will visit, is where the horses which are bred and trained by Takapoto are kept in Cambridge township.

This experience will be facilitated by Cristina Wilkins with support from Dr Ina Draganova.

Riding for the Disabled New Zealand, at Cambridge Group, Riding for the Disabled
In this RDA-focused experience, representatives from New Zealand Riding for the Disabled and Cambridge Group RDA have kindly opened their doors to give us insight into Providing a Good Life for Horses in the context of equine-assisted therapy. We explore the challenges and opportunities of creating interactions with horses in human services where welfare is not negatively impacted and horses are able to live a Good Life.

This experience will be facilitated by Prof. Hayley Randle with support from Bridget Dougherty.

Pike Racing

Pike Racing is a prominent and successful thoroughbred racing operation. Owner and head trainer Tony Pike has led Pike Racing to significant achievements, including more than 20 Group 1 winners over the past decade. The team at Pike Racing is led by Tony and Kirsten Pike. They are known for their meticulous approach to identifying talent, developing, training horses, and their strategic race planning.

This experience will be facilitated by Dr Rachel Annan and Prof. Chris Rogers.

'Off the bit' sundowners social event

At the end of the field day (approximately 4.30pm), buses will deliver everyone back to central Cambridge for an informal social event. Drinks and finger food/canapes will be provided.

This event is generously supported by New Zealand Thoroughbred Racing and will be held at the Cambridge Community Pavilion, overlooking the Village Green in the heart of Cambridge. Please check your ID tag which shows if you have registered for this event as it is catered.

DAY 3 Application to provide a Good Life for horses sponsored by Via Nova

16th March 2024

Don Rowling Centre on Lake Karapiro

Buses leave Cambridge pick up points from 8am

Presenting authors are underlined

9.10 am	**Field day outcomes and discussion**	
Theme 4 The impact of life experiences sponsored by New Zealand Warmblood Association		
Theme 4 chair Professor Kathalijne Visser		
9.30	PL4	SETTING HORSES UP FOR A GOOD LIFE Associate Prof. Janne Winther-Christensen jwc@anivet.au.dk
10.00	RP12	FAMILIARISATION, POSITIVE ASSOCIATIONS AND ITS EFFECTS ON FOALS RESPONSE TO A FEAR TEST Gabriel Carreira Lencioni, Ana Carolina Dierings Montechese, Thainara Lopes, Milena Schempp Consorti, Gustavo Venâncio da Silva and Adroaldo José Zanella gabriel.lencioni@gmail.com
10.15	RP13	THE INFLUENCE OF PERCEIVED EQUINE PERSONALITY ON POLICE HORSE SELECTION Kiana McDole and Katrina Merkies kmcdole@uoguelph.ca
10.30	RP14	OWNER-OBSERVED BEHAVIOURAL CHARACTERISTICS OF OFF-THE-TRACK THOROUGHBREDS (OTTTBS) IN EQUESTRIAN SECOND CAREERS Anne-Louise Knox, Kate Fenner, Rebeka Zsoldos, Bethany Wilson and Paul McGreevy ottracehorse@hotmail.com
10.45	Morning coffee	
Theme 5 The Horse-Human interaction sponsored by Edinburgh University		
Theme 5 chair Professor Hayley Randle		
11.15	PL5	SAFE, EFFECTIVE AND ETHICAL HORSE-HUMAN INTERACTION Kathalijne Visser k.visser@aeres.nl
11.45	RP15	IDENTIFYING RISK FACTORS FOR CONFLICT BEHAVIOURS IN CANADIAN RIDING LESSON HORSES Caleigh Copelin and Katrina Merkies ccopelin@uoguelph.ca
12.00	RP16	THE EFFECT OF TOUCH ON HORSES DURING HUMAN-HORSE INTERACTIONS Amir Sarrafchi, Elodie Lassallette and Katrina Merkies asarrafc@uoguelph.ca
12.15	RP17	DIFFERENCES IN JOCKEY POSITION ALTER MUSCLE RECRUITMENT AND HORSE-RIDER INTERACTION Kylie Legg, Darryl Cochrane, Erika Gee and Chris Rogers k.legg@massey.ac.nz
12.30	RP18	EXPLORING ATTITUDES OF VETERINARY HOSPITAL STAFF TOWARDS PAIN ASSESSMENT IN HORSES: A QUALITATIVE STUDY Olivia Curry, Alice Everett, Juliet Duncan, Gemma Pearson and Cathy Dwyer O.G.Curry@sms.ed.ac.uk

12.45	Lunch	
	Posters-as-a-slide on screen - loop	
	PAS7	AN INVESTIGATION INTO THE EXERCISE HABITS AND PERCEPTIONS OF EQUESTRIAN RIDERS Melinda Behrens-Macaulay, Crystal Kean and Celeste Wilkins mel.macaulay@strongstableseat.com.au
	PAS8	BUILDING A PROFILE OF RIDERS IN RIDING SCHOOLS IN THE UK Matilda Edmunds, Linda Greening, Hayley Randle, Cara Clasper, Beth Lothian and Jane Williams jane.williams@hartpury.ac.uk
	PAS9	A GOOD LIFE FOR HORSES BY DESIGN: A REVIEW OF THE EVIDENCE AND PRACTICE OF EQUINE ENVIRONMENT DESIGN AND CONSTRUCTION Leonie Lee leonieleeemail@gmail.com
	PAS10	SHARING HORSE CARE KNOWLEDGE IN CULTURALLY APPLICABLE METHODS TO ENGAGE NATIVE AMERICAN TRIBAL COMMUNITIES TO PROACTIVELY CONTRIBUTE TO THEIR HORSES BEST LIVES Elizabeth Greene, Deborah Reed and Juan Arias betsygreene@arizona.edu
	PAS11	IDENTIFICATION OF EQUINE FARMER'S NEEDS AND SOLUTIONS IN THE AREAS OF HEALTH AND WELFARE OF EQUIDAE, SOCIO-ECONOMICS AND SUSTAINABILITY Sarah Lojewski, Sandra Kuhnke, Anissa Dudde and Uta König v. Borstel sarah.lojewski@agrar.uni-giessen.de
Theme 6 Sustainable and ethical equine practice sponsored by The Horse Trust		
Theme 6 chair Associate Professor Janne Winther-Christensen		
13.45	PL6	HOW SHOULD WE THINK ABOUT EQUINE ETHICS IN THE ERA OF ONE HEALTH AND ONE WELFARE? Madeleine Campbell madeleine.campbell@nottingham.ac.uk
14.05	RP19	CARBON FOOTPRINT OF A DUTCH JUMPING AND DRESSAGE HORSE Iris Huisman, Theun Vellinga and Hassan Pishgar Komleh iris.huisman@wur.nl
14.20	RP20	HORSE OWNER KNOWLEDGE OF FUNDAMENTAL CARE AND THEIR PERCEPTIONS ON THE IMPLEMENTATION OF A MANDATORY CERTIFICATE OF KNOWLEDGE Megan Watney, Bryony Lancaster and Hayley Randle V1mwatne@exseed.ed.ac.uk
14.35	RP21	THE WICKED SITUATION OF HORSE WELFARE: FINDING RECOMMENDATIONS FOR THE FUTURE Julie Fiedler jmfiedler@student.unimelb.edu.au
Lightening talks for Day 2 *Application to provide a Good Life for horses*		
14.50	LT7	HORSES' BEHAVIOURAL RESPONSES TO EQUINE ASSISTED COACHING: IMPLICATIONS FOR SAFETY Kathalijne Visser, Kyra Maarleveld, Pieter Tromp and Sandra Haven-Pross k.visser@aeres.nl
	LT8	A MOVE IN THE RIGHT DIRECTION: TRACKING THE TRACEABILITY OF UK THOROUGHBREDS Jane Williams, Saranna Jordan, Laura Friend, Matilda Edmund and Stephen Wensley jane.williams@hartpury.ac.uk

	LT9	TRANSFORMING RETRAINING: USING MULTIDISCIPLINARY EXPERT CONSENSUS TO IMPROVE SUCCESS RATES IN RACEHORSE'S SECOND CAREERS Jane Williams, Kathryn Nankervis, Saranna Jordan, Laura Friend, Matilda Edmunds, Jessica Williams and Gillian Tabor jane.williams@hartpury.ac.uk
	LT10	PRELIMINARY STUDY ON THE INFLUENCE OF HORSE TEMPERAMENT ON BEHAVIOURAL RESPONSES TO BEING BLINDFOLDED Hayley Badner, Caleigh Copelin, Bryn Hayman, Renée Bergeron and Katrina Merkies kmerkies@uoguelph.ca
	LT11	SUSTAINABILITY IN EQUINE SCIENCE: A SYSTEMATIC REVIEW Linda-Maria Dimitrova Mårtensson and Hanna Sassner linda.maria.martensson@slu.se
	LT12	LESSONS LEARNT FROM HORSE-RELATED HUMAN FATALITIES: ACCIDENT ANALYSIS USING HFACS-EQUESTRIANISM Meredith Chapman, Kate Fenner and Matthew Thomas meredithchapman63@gmail.com
	LT13	A SCORING SYSTEM AND KEY FEATURES TO GUIDE GRADING OF QUALITY OF MOVEMENT Annette Bowen, Gillian Tabor, Raphael Labens and Hayley Randle abowen@csu.edu.au
15.00	Afternoon tea	
Theme 7 Free papers		
Theme 7 chair Professor Natalie Waran		
15.30	RP22	POLO: WHAT DO WE KNOW NOW? Russell Best Russell.Best@wintec.ac.nz
15.45	RP23	HOW DOES THE INTERNATIONAL EQUESTRIAN COMMUNITY VIEW THE SUITABILITY AND VERSATILITY OF RETIRED THOROUGHBRED RACEHORSES IN A SECOND CAREER? Natasha Rose, Tamzin Furtado and Debbie Archer natasha.s.rose@hkjc.org.hk
16.00	RP24	OBSERVATIONAL INDICATORS OF FATIGUE DURING THE CROSS COUNTRY PHASE OF EVENTING Olivia Cattle, David Marlin and Jane Williams Jane.williams@hartpury.ac.uk
16.15		Handover to ISES 2025
16.20		Conference wrap up

7pm prompt 'Forage and Frolic' conference gala dinner sponsored by Spectravet.

The Boat Shed, Karapiro 21 Amber Lane, Cambridge

BIOGRAPHIES OF CLEVER HANS SPEAKER, PLENARY SPEAKERS, KEYNOTE SPEAKERS, PANEL MEMBERS, SESSION-THEME CHAIRS AND LOCAL ORGANISING COMMITTEE

Local Conference Organising Committee

Prof. Natalie Waran | Companion Animals NZ, New Zealand

Nat is an internationally recognised animal behaviour and welfare scientist, educator and opinion leader. Based in either the UK and NZ, she has extensive experience working with veterinary organisations, universities, NGOs and governments across a range of different countries, but has spent a considerable amount of time working in China, India and other parts of Asia.

Nat gained a First Class Hons Zoology Degree from Glasgow University and a PhD in Applied Animal Welfare under the supervision of Professor Don Broom at Cambridge University veterinary school sponsored by the BVA. She moved to Edinburgh University in 1990 to lead the establishment of the well-respected Masters in Applied Animal Behaviour and Animal Welfare and has since then led the establishment of a number of Animal welfare programmes, as well as a number of highly successful MOOCs.

She was appointed as the Jeanne Marchig Professor of Animal Welfare, and inaugural Director of the Jeanne Marchig International Centre for Animal Welfare Education as well as the International Dean at Edinburgh University's Veterinary School. She moved back to NZ in 2016 to take up the role of Professor of One Welfare and Executive Dean at EIT. Over the past 30+ years, she has researched and published across a range of areas including horse transport, indicators of equine stress and pain, equine problem behaviour and equine quality of life and welfare assessment. Recent research funded through the Hong Kong Jockey Club's Welfare Foundation and in collaboration with an international team, is to develop methods for assessing positive emotion (affect) in horses. She has been a trustee for a number of international equine charities such as The Brooke and International Fund for Animal Welfare and worked closely with others such as World Horse Welfare. A co-founder of the International Society for Equitation Science (ISES), she is now Honorary Fellow and Trustee for the organization. She has recently been appointed as inaugural Director of a new 'Good Life for Animals' Collaborative Centre funded by Companion Animals New Zealand, to 'raise the bar' for companion animals including horses through the development of new research areas, and human behaviour change projects. She is passionate about disseminating evidence-based information to inform practice, and to this end she is the chair of the local organizing committee for the ISES 2024 conference to be held in NZ with the theme of 'A Good Life for all Horses'. As the invited chairperson of the FEI's independent Equine Ethics and Wellbeing Commission, she recently led the development of a report outlining a new vision for a 'Good Life for Horses in Sport' including an Equestrian Charter and 30 Recommendations to ensure equine welfare in sport is prioritized and to maintain equestrian sport's social licence. When at home in Hawke's Bay, Nat enjoys training and riding her own horses as well as coaching other equestrians.

Prof. Hayley Randle | Charles Sturt University, Australia

Hayley is Professor of Equine Science at Charles Sturt University, Australia. She is passionate about animal welfare and makes national and international contributions. She has an Australian government appointed role as chair of the NSW Animal Welfare Advisory Committee, is an active member of The National Primary Industries Animal Welfare Research, Development and Extension Strategy organization (NAWDRES) and holds international journal Associate Editor positions. Having held Honorary Council roles for the International Society for Equitation Science, she is now an ISES Honorary Fellow and ISES Trustee, through which she is actively progressing international strategy for horses used in all disciplines. She likes nothing more than seeing her students thrive and is very proud of both her undergraduates contributing to change in the equine industry and post graduate students engaged in cutting edge equitation science research. In her spare time, she enjoys spending time with her mob of horses, three kelpies and border collie, long suffering partner and dirt biking teenage son.

Ella Bradshaw-Wiley | Charles Sturt University, Australia

Ella is a lecturer in Equine Science at Charles Sturt University, with a keen interest in horse behaviour and training. A previous background in multiple areas of the equine industry including professional stables, thoroughbred studs, equestrian magazines and diagnostic labs has led her to becoming passionate about the future of the equine industry and the preservation of its Social Licence. Ella's current area of research centres on investigating the effects of combined reinforcement on learning speed and behaviour quality in the horse, and how this can be used to improve safety and the horse-human relationship. Outside of research, Ella is a passionate advocate for the re-training of retired racehorses.

Julie Malcom | Ridewell, Trainwell, New Zealand

Julie Malcolm, Equestrian Coach (dressage and rider biomechanics) - Ridewell Trainwell. Certified Franklin Method Equestrian Ball Coach and Spine Trainer. Julie completed B.Agr.Sci (Hons 1) and Massey Scholar in 1986 and was an Agriculture and Equine farm management consultant and Diploma level trainer for over 30 years. These days Julie runs her own equestrian coaching business Ridewell Trainwell and provides assessment and moderation consultancy to Primary Industry Training (Te Pukenga) and Food and Fibre Workforce Development Council (Muka Tangata). Julie is a national dressage judge, ESNZ Development Dressage and Para Dressage Coach. She was formerly the president of Auckland Manukau Area Dressage Group and a board member of Dressage New Zealand and competed to advanced level dressage. She has post graduate training in adult education, assessment and moderation, spine and pelvis biomechanics and has undertaken numerous informal courses in horse and rider biomechanics and equine behaviour.

Bridget Dougherty | Capabuild, New Zealand

Bridget's day job is a learning and capability specialist, and she has worked on hundreds of projects across private and public sector organisations in New Zealand. She helps to design and develop learning approaches and experiences for complex problems and often technical topics. Bridget has been involved with equitation science since 2007 when she first attended one of Dr Andrew McLean's clinics in New Zealand. She has since gained her Diploma in Equitation Science through Equitation Science International. She weaves her equitation science consulting and coaching around her day job commitments and provides tailored support to a small number of organisations and students.

Leigh Wills | Foal NZ and Winning FORM

Leigh is passionate about horses and better known for her work with foals. Under Foal NZ, she continues to work in the field and partners with institutions to publish research. An injury has led to a new direction of thoroughbred welfare, under the Winning FORM banner. Leigh has partnered with University College of Dublin (UCD) to deliver FORM, a thoroughbred welfare assessment for horses to fulfil the International Federation of Horseracing Authority (IFHA) requirements. Winning FORM also offers training and assessments to empower Stablehands to be the voice of the horse. Leigh sends a huge welcome to all the delegates and is looking forward to seeing you all soon.

Jody Hartstone| Hartstone Equestrian

Jody Hartstone is a former Practitioner Member on the ISES Council and has enjoyed many of the ISES Conferences around the world over the past 20 Years. Jody competes in dressage up to Grand Prix Level and is an international trainer and coach specializing in the behavioural aspects of horse training. She has a particular interest in Social License to Operate in equestrian sport along with the pedigree recording and traceability of sport horses in New Zealand. Outside of training, coaching and competing, Jody enjoys learning to surf and hunting with hounds.

Prof. Chris Rogers | Massey University, New Zealand

Chris has a dual appointment in both the School of Veterinary Science and the School of Agriculture and Environment at Massey University. Professor Rogers' research interests include equine biomechanics, equine exercise physiology, equine industry epidemiology, and equestrian sport. His programme of research and teaching has been pivotal in providing the background knowledge needed to describe and improve equine production in New Zealand and internationally.

Dr Kylie Legg | Massey University, New Zealand

Kylie is a lecturer in equine science at Massey University in the School of Veterinary Science. She has a strong background in engineering as well as 20 years practical experience of working and training horses and people for various sport and recreation industries worldwide. These skills have combined to focus her research interests in equine biomechanics, human and equine exercise physiology and interactions, equine industry epidemiology, health and welfare.

Dr Ina Draganova | Massey University, New Zealand

Ina is a Senior Lecturer in Animal Science (School of Agriculture and Environment, Massey University) specialising in animal behaviour and welfare with a focus on behaviour problems in dogs, cats and horses, and the use of behaviour modification techniques that reflect current understanding of how animals learn to mitigate these. Ina teaches canine and equine behaviour, training, and handling to veterinary and animal science students. Main area of research investigates how environmental factors affect animal behaviour and how we can successfully use emerging precision tools to track, monitor and analyse these interactions.

Dr Jane Williams | Hartpury University, United Kingdom

Jane is an Associate Professor and Head of Research at Hartpury University with a passion for enhancing equine performance and wellbeing. Jane qualified as a Veterinary Nurse then gained her Masters in Equine Science before completing her doctorate exploring the application of surface electromyography as a tool to assess muscle adaptation during training in racehorses and sport horses. Her main areas of professional interest include scientific evaluation of equestrian management, performance, and training, and how these link to equine wellbeing, and horse-human interaction. She is a former Honorary President of the International Society of Equitation Science and a founding member of the Sporthorse Welfare Foundation. Jane works regularly with industry stakeholders, riders, and trainers across horse sports to help them improve their horses' success and quality of life.

Clever Hans lecture speaker

Professor Craig Johnson | Massey University, New Zealand

Craig qualified from Liverpool Veterinary School in 1989. After a spell in small animal practice, he moved to The Animal Health Trust in Newmarket, UK as Resident in Veterinary Anaesthesia. He obtained his RCVS Diploma in Veterinary Anaesthesia in 1992 and after a time as a locum lecturer in Pretoria, South Africa returned to the UK and gained a PhD from Cambridge University. From 1996 – 2001 Craig was a Lecturer in Veterinary Anaesthesia at Bristol University, UK. In April 2001 he moved to Massey and is now Professor of Veterinary Neurophysiology. He is co-director of The Animal Welfare Science and Bioethics Centre. In 2020 he was awarded a DSc for his work developing the minimal anaesthesia model. Craig has authored a total of 283 publications including 118 in the peer-reviewed literature and has supervised 43 postgraduate students and 3 postdoctoral fellows. His work has attracted seven international awards including the Humane Slaughter Association Inaugural Award and the Cam Reid Oration.

Plenary speakers

Professor Paul McGreevy | University of Sydney, Australia

Paul is a riding instructor, veterinarian and ethologist. His PhD focused on the functional significance of stereotypic behaviour in stabled horses. Based at the Sydney School of Veterinary Science, he is the author of over 300 peer-reviewed scientific publications and seven books and has received numerous international awards for his research and teaching innovations.

Dr Andrew McLean | Equitation Science International, Australia

Andrew is a clinical and forensic ethologist with specialist academic areas in animal cognition, equine learning/training and welfare science.

As an independent scientist, Andrew has authored and co-authored in excess of 80 research and review papers and conference presentations and 10 horse and elephant training texts. In 2020, he co-authored the most recent Five Domains Model of Animal Welfare, focusing on human-animal interactions. Andrew has been co-winner of the Eureka Science award and the Premio Flambo Award for Animal Welfare (Italian Equestrian Sports Federation). In 2014, he was awarded the John H Daniels Fellowship from the USA National Sporting Library, Virginia and in 2016, he was King Scholar invitee at the University of Arkansas.

Andrew has dedicated the past couple of decades to teaching evidence-based horse training and management in workshops across Western Europe as well as the USA, Canada, South Africa and New Zealand. In doing so, he has coached four Olympic medalists, seven National Equestrian Federations and in 1996 he coached the Indian Eventing team to win its first ever medal in international competition using techniques that he derived from and understanding of equine learning and cognition. Andrew founded and directed the Australian Equine Behaviour Centre in 1995 and is currently the CEO of Equitation Science International. He is Patron of Pony Club Australia and as a former Director, he has instigated a revolutionary syllabus that leads the world in equestrian education for young riders. Andrew is also Founder of the Human-Elephant-Learning Programs Foundation, a not-for-profit charity that delivers evidence-based elephant training, management and conservation education across South and Southeast Asia and is supported there by various government organisations. He is also the Australian representative of the IUCN Asian Elephant Specialist Group.

A winner of the Advanced section of the famous Gawler Three-Day-Event in 1989, Andrew has enjoyed a decorated and very diverse equestrian sport career. He has represented Australia in three-day eventing and competed in State and National titles in FEI dressage, eventing and showjumping and more recently was Australian National Champion in Tetrathlon in 2018 in the 32+ age group.

Dr Cathrynne Henshall | Charles Sturt University, Australia

Dr Cath Henshall is a current post-doctoral fellow at Charles Sturt University investigating behavioural and physiological indicators of positive emotions in Thoroughbred racehorses. The international project is funded by the Hong Kong Jockey Club Welfare Foundation. The project is applying cognitive and affective neuroscience concepts in combination with cutting edge and established technologies to detect and validate positive emotions in horses.

Cath has worked in a variety of roles providing animal welfare expertise to government and industry organisations and participants in the field of participant education, animal welfare law enforcement and professional development in animal welfare assessment and management to industry officers.

Cath has recently been a guest lecturer at Western Sydney University and Charles Sturt University in the fields of animal welfare and equine behaviour. Cath also taught equine studies and livestock production welfare in the NSW vocational education system working with the equine and livestock production industries and students to bridge the gap between research and its practical implementation by industry participants.

Prior to commencing her PhD project, Cath also ran an equitation science based horse training and rider education business, providing evidence-based horse training services to clients as well as rider education and coaching in equitation science principles and horse-centred training, management and welfare. Cath has extensive experience communicating academic concepts to varied audiences and working collaboratively with people from a wide range of backgrounds to improve training and welfare outcomes for animals in industry and recreation.

Associate Professor Janne Winther-Christensen | Aarhus University, Denmark

Janne Winther Christensen is Associate Professor at the Department of Animal and Veterinary Sciences, Aarhus University, Denmark. She has conducted a number of research projects on horse behaviour, stress reactions and welfare. Her licentiate, PhD and post doc projects focused on fear reactions in horses and how to avoid them through appropriate desensitization techniques and social transmission of behaviour. She has also conducted a number of research projects on housing and management, incl. the effects of (lack of) social contact for horses. Another research interest is learning and training, including how the rider and various training methods, such as hyperflexion, effects horse behaviour and stress physiological responses. Her current research focuses on (i) maternal influence on the development of behaviour and stress sensitivity in foals, (ii) conflict behaviour in sports horses, and (iii) welfare of feral horses.

Professor Katalijne Visser | Aeres University of Applied Sciences, The Netherlands

Professor Dr Kathalijne Visser, an esteemed expert in Human-Animal Interactions, holding a professorship at Aeres University of Applied Sciences, Dronten. She earned her Animal Science degree from Wageningen University and completed her groundbreaking PhD on horse personalities at Utrecht University in 2002. Her doctoral work, titled "Horsonality," focused on the personality of horses and marked a significant contribution to equine behaviour studies. After completing her PhD, Dr Visser continued to lead impactful research projects in the realm of equine welfare, particularly concerning housing, feeding, and training of horses. In 2012, she played a pivotal role in developing the Dutch welfare monitoring system for horses, drawing from the Welfare Quality system principles. Her expertise also extends to co-promoting several PhD students, thereby nurturing the next generation of scholars in her field. She chaired the organizing committee of the ISES Conference in the Netherlands in 2011, a significant event for the society. In her current role, she focuses on the welfare of dogs and horses in work, therapy, sports, and recreation, and is a recognized member of the FEI Equine Ethics and Well-Being Commission. Throughout her career, she has consistently demonstrated a deep commitment to improving the well-being of animals, particularly horses and dogs, through her research, teaching, and various leadership roles in professional societies and commissions.

Professor Madeleine Campbell | Nottingham University, United Kingdom

Madeleine is Professor of Veterinary Ethics at Nottingham University, and director of Empathy Veterinary Ethics. She is Chair of the British Animal Welfare Committee which provides expert, independent advice to Defra and the Scottish and Welsh governments. Madeleine also acts as Chair of the British Equestrian Federation's Ethics and Welfare Advisory Group, was an independent member of the FEI's Equine Ethics and Wellbeing Commission, is Chair of the Greyhound Board of Great Britain's Welfare and Veterinary Science Committee and holds appointments to the RCVS Ethics Review Panel and British Horseracing Authority's Ethics Panel. Madeleine's active research interests encompass ethical issues surrounding the use of animals in competitive sport, and the ethics of assisted reproductive technologies in non-human mammals. She is the author of numerous peer-reviewed papers on veterinary and animal ethics, and of the book 'Animals, Ethics and Us'. Madeleine is an equine vet and a keen equestrian - she currently enjoys riding a Morgan horse who is the third generation she has bred and is just starting his son to saddle.

KEY INFORMATION ABOUT ISES 2024 ABSTRACTS AND PRESENTATIONS

Plenaries are denoted by PL.

Research presentations are denoted by RP.

Lightning talks are denoted by LT. These are 2 minute 'teasers' supported with a powerpoint slide.

Poster-as-a-slide presentations are denoted by PAS, and are visual only and played on a loop during a break. Authors contact details are provided in the abstracts.

Abstracts are arranged in the order in which they appear in the scheduled programme (pages 22-29).

Direct links are provided to abstracts from the programme.

Abstracts commence at page 40.

CONFERENCE ETIQUETTE

It is wonderful to have you at this conference. We want everyone to get the most out of the event and to go away feeling enriched. There are a few important ways that we can ensure that this is the case. Obviously, all of us are professionals which will mean that we are familiar with the importance of:

- treating everyone with respect and consideration,
- communicating openly and thoughtfully with others and being considerate of the multitude of views and opinions that are different than your own,
- being respectful and mindful in your critique of ideas,
- being an active listener, turning off your mobile phone and avoiding exiting the room during a talk, *and,*
- being mindful of your surroundings, your fellow participants, sponsors, conference volunteers, and venue hosts.

We also ask that you respect the rights of our presenters in relation to their research presentation material. Sharing insights and key messages from presentations with your network or social media is encouraged, as long as you are not posting specific research aspects of an author's presentation. Recording of research presentations for use later or posting directly onto social media is not appropriate. This may only be done with the permission of the authors.

We hope you have a great time!

CLEVER HANS LECTURE sponsored by Hartpury University

NOT JUST WHAT DO WE KNOW, BUT HOW DO WE KNOW IT? DIFFERENT WAYS OF UNDERSTANDING HORSES AND EQUESTRIANISM.

Craig Johnson

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Knowledge is acquired in different ways by different people, at different times. What we know is important, but the different ways of coming to know something have different advantages and disadvantages that allow us to use our understandings in different ways.

This presentation will explore the four major ways in which we can come to know things (empiricism, authoritarianism, experience, and intuition) using an example outside of our equine experience and other examples from the realm of equitation.

Whilst any one way of knowing something is essentially incomplete, we all have a tendency to favour some ways of knowing things over others. If we are to come to a complete picture, it is important to treat those who have different kinds of knowledge as having something to offer, rather than criticising their understanding and discounting it. In better understanding the four ways of knowing, I'm hopeful that we can better appreciate and value our different contributions to the understanding of our horses.

Return to programme

DAY 1: THE FUNDAMENTALS OF PROVIDING A GOOD LIFE FOR HORSES
sponsored by Equitation Science International

THEME 1: A GOOD LIFE FOR HORSES sponsored by Companion Animals New Zealand

PL1

"A GOOD LIFE FOR HORSES" - WHY WE SHOULD BOTHER AND HOW ONE CAN ADVOCATE

Paul McGreevy

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Horses in our care deserve a good life because they are arguably more vulnerable to abuse than any other domestic species. On top of that we ride them and compete with them; often using aversive stimuli to push them to their physical limits and beyond. For all these reasons, horses in our care deserve excellent standards of care, standards that match horses' lives with their telos and bear close scrutiny under the Five Domains model.

Data from equitation scientists can help ethicists and owners to explore what stakeholders mean by a good life for horses and whether horses in different contexts can live a good life. When scholars know their data well and can see their findings being ignored, they should be comfortable enough to speak out. In this presentation, I will explore how scientists can advocate for standards of care and why being a public scientist is not an easy choice.

For far too long the public regard for evidence-based arguments has been suppressed by the power of media and corporations. And while the importance of being a good communicator is ostensibly supported in academia, the mainstream media seems to have more time for scholars from the humanities than those from the sciences. On the bright side, the realities of Covid-19 and climate change have encouraged more people to recognise the importance of peer-reviewed data. Communication in such a contested space means that activists are increasingly relying on research to challenge the *status quo*. However, I have discovered that when scientists use the same data, even when it is from their own labs, they can also expect to be labelled activists.

This presentation explores how best to establish and manage public commentary when your research or areas of expertise intersect with industries and contradict their position. It also touches on how to decide when to comment and how to make yourself heard.

Veterinary practitioners are rarely short of an opinion, but what happens when veterinary scientists believe change is needed and they hold what may be pivotal data? I will offer a perspective from more than 35 years as a veterinarian, 30 of those specialising as an animal welfare scientist, where my work has revealed evidence that is often disliked in the competitive worlds of racing, equestrianism, and companion animal breeding.

Lay person message: Data from equitation scientists can help ethicists and owners explore what stakeholders mean by a good life for horses. This presentation will focus on the needs of early career researchers in equine science and will offer advice for those contemplating putting their heads above the parapet.

Keywords: advocacy; standards of care; Five Domains; Mellorater

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RP1

MONITORING THE CUMULATIVE USE OF HORSES WORKING IN EDUCATION: MOVING TOWARDS ACHIEVING A GOOD LIFE

Lindsay Skyner[1], Skye Wassens[2], Anna Dennis[3] and Hayley Randle[2]

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Whilst there is global interest in the welfare of horses in high-profile contexts such as horse racing and the Olympics, there is substantially less on non-performance horses such as those who work in Universities, where they make a significant contribution to the education of equine science and especially veterinary science students. The *Australian code for the care and use of animals for scientific purposes (2013)* not only requires that animal use is approved by an independent animal ethics committee (AEC), but that the impacts of cumulative use over an individual's work lifetime are carefully managed to safeguard the animal's wellbeing. Charles Sturt University is currently home to 69 donated, repurposed Thoroughbred and Standardbred horses servicing teaching and research activities. From 2019-2022, demand on horses for teaching activities increased from 3.2 uses per horse/month in 2019 to 5.0 uses per month in 2022, while research use increased from 4.6 in 2020 to 10 in 2021. Retrospective analysis of horse-use data and concomitant behavioural concerns when horses experienced sequential days of use (up to 8), by various users, under different AEC authorities, confirmed the inadequacy of a management process based on yearly use. A monitoring system, developed by a collaborative cross disciplinary team, to quantify the potential cumulative impacts of work on individual horses was introduced in July 2023, with activities categorized according to level of intervention and points awarded accordingly (1=minimal-5=maximum). When adults accrue 60 points, and <yearlings accrue 40 points, a continuous 6-week break is enforced. The resulting mandatory Standard Operating Procedure (AEC-SOP6.1) is used by academics to advise expected impacts on horses in their teaching/research ethics applications. Actual usage-points are then recorded independently in real-time by technical staff during activities. Preliminary evaluation of six most frequently used horses (n=1951 uses) between August 2019-January 2024 show first, a reduction in intensity and second, a change in distribution of horse-use. Prior to AEC-SOP6.1 implementation research and teaching activities often occurred in the same week, these periods of high intensity use appeared to have a more deleterious impact on horse wellbeing. Despite only being in place for 8 months, cumulative horse-use monitoring has positively impacted horse-use and likely their wellbeing. In a world where horse use is quite rightly subject to increasing public scrutiny, educational institutions must optimise the management and use of their working horses to ensure they have a Good Life.

Lay person message: Performance horse welfare is under increasing public scrutiny to such an extent that some horse-based activities could be lost. Horses working in educational institutions have been largely overlooked, however in Australia legislation requires the impact of cumulative work on horses used for teaching and research to be managed in such a way that their welfare is safeguarded. An objective, points-based cumulative use monitoring system, mandating 6-week long work-breaks, implemented with 60+ horses at Charles Sturt University has improved horse use and welfare. Educational institutions must model optimal management to provide horses used for teaching and/or research with a Good Life.

Keywords: Horse, welfare, education, cumulative use, ethical oversight, Good Life

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RP2

A GOOD LIFE FOR HORSES: HOW USEFUL ARE PHYSIOLOGICAL MEASURES OF STRESS IN THE FIELD?

Karly Liffen, Cathrynne Henshall, Jessica Rose and Hayley Randle

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There has been limited research on the welfare of non-sporting working horses in high income countries. For working horse welfare to be understood and safeguarded it is important to identify measures of stress that can be easily obtained in potentially challenging field-based situations. This study compared physiological measures of stress in three types of non-sporting Australian working horses under working (W) and non-working (NW) conditions. Salivary cortisol and eye temperature were measured using infrared thermography (IRT). Data were obtained from 22 horses (12 geldings, 10 mares) working in a riding school (n=8), cattle feedlot (n=7) and at a university (n=7) on three working days and two non-working days. Workload per day varied from 2 hours (riding school and university) to 10-12 hours (feedlot), up to 5 days per week. Three saliva samples were taken per horse/ day along with two IRT images, taken three times per day/horse for each eye. Measurements were taken AM (6am-8am), midday (12pm-2pm) and PM (6pm-8pm). Saliva was collected with a cotton swab inserted into the horse's mouth for a minimum of 30 seconds. Static IRT images were captured from 1±0.5m perpendicular to the horse's eye. Salivary cortisol concentration (ng/mL) was determined using a Salimetric's competitive immunoassay kit. For IRT, mean temperature (˚C) for left eye and right eye images were extracted and combined. All data were non-parametric. Horses working in feedlots had significantly higher cortisol concentrations when W (median = 1.1, IQR=0.7) than when NW (median = 0.9, IQR = 0.6; Kruskal Wallis = 4.299, $p<0.05$). Working also significantly impacted university horses (Kruskal Wallis = 7.749, $p<0.01$) with higher cortisol concentrations when NW (median = 1.4, IQR = 1.7) than when W (median = 1, IQR =1.2). For feedlot horses eye temperatures (˚ C) were significantly greater when W (median = 36.3, IQR= 1.1) than when NW (median = 35.9, IQR = 0.8; Kruskal Wallis = 5.988, $p<0.05$). For riding school horses and university horses' eye temperatures did not differ whether W or NW (Kruskal Wallis = 0.149, $p>0.05$; Kruskal Wallis = 0.937, $p>0.05$ respectively). Whilst in-field sampling of salivary cortisol may be useful for assessing working horse welfare under intense working conditions and ultimately if the horse is likely to be experiencing a good life, the use of IRT to determine eye temperature is unlikely to be a useful field measure due to confounding environmental factors, such as solar radiation masking the effects of stress.

Lay person message: The welfare of non-sporting working horses in Australia has received very little research attention. Salivary cortisol may reflect an individual animal's level of stress, as can eye temperature. Salivary cortisol and eye-temperatures obtained for horses working in a riding school, university or in a cattle feedlot were compared when these horses were working or not working. Data analysis indicated that whilst cortisol could be a useful field-based measure of stress when the horse was working intensely, measurement of eye temperature was of limited use to determining whether a horse was experiencing a good life.

Keywords: In-field, welfare, stress, cortisol, eye temperature, working horse

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RP3

DELIVERING A GOOD LIFE FOR RACEHORSES - DEVELOPMENT OF A PRACTICAL WELFARE ASSESSMENT PROTOCOL

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Racehorse welfare continues to attract increasing public attention, however scientific evidence of welfare assessment of racehorses is lacking. To develop a better understanding of racehorse welfare, it must be measured and monitored. The aim of this study was first to investigate welfare measures which could be used in the first welfare assessment protocol for racehorses, second, to understand the effect that a racing and training season had on individual racehorses and third, to identify risk factors for both good and poor welfare. Behavioural observations along with individual environmental and animal-based welfare measures were recorded for 353 horses in 13 training yards in England, both at the beginning and the peak of the Flat and Jump racing seasons. Yards were selected for variability in terms of size, location, and level of racing. Each of the welfare measures were modelled as an outcome variable against potential risk factors for good or poor welfare outcomes in racehorses, using binomial Generalized Linear Mixed Models (GLMMs) and linear mixed-effects models for binomial and continuous measures respectively. The horses were generally in good physical health: 94% of horses recorded as an ideal body condition score, no horses had signs of hoof neglect and 77.7% had no nasal discharge. The overall prevalence of external Mouth Corner Lesions was 12.9% and was significantly higher ($p<0.01$), for Flat racing than Jump racing horses. The majority of horses (67.5%) showed positive horse human interactions. When stabled, 54.1% horses had physical social contact and nasal discharge was not associated with increased physical contact ($p>0.05$). The training season significantly increased Horse Grimace Scale scores ($p<0.01$) and time spent resting, ($p<0.01$), while positive Human Reactivity Tests ($p<0.01$) and time spent feeding ($p<0.01$) decreased over the course of the season. A total of 14.5% of horses displayed stereotypic behaviour on at least two occasions. Horses with windows in their stables spent significantly more time surveying their surroundings than those horses without windows. Overall, the racehorses in this sample spent around a third of their daytime feeding (33.7%) and a further 22.6% standing resting. Horses were observed lying down more often when they had physical social contact with other horses. The welfare assessment protocol used in this study is suitable for use in industry to measure and monitor equine welfare. This can ultimately identify challenges to welfare in addition to highlight areas of good practice to help ensure that racehorses experience a Good Life.

Lay person message: Measuring and monitoring equine welfare can ensure that racehorses experience a Good Life. The welfare assessment protocol used in this study proved to be suitable for industry use to collect welfare data on racehorses in a training yard environment. When assessing racehorse welfare, using a holistic assessment protocol which encompasses both environmental and animal-based indicators ensures a full picture of welfare can be gained. If racehorses are expected to work at the upper limit of equine athletic ability, it is important that, overall, they experience many positive experiences in order to achieve a positive welfare balance, and a good life.

Keywords: Racehorse, equine, welfare, behaviour, assessment, Thoroughbred

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RP4

TOWARDS THE VISION OF A GOOD LIFE FOR HORSES: A SUMMARY OF THE WORK OF THE FEI APPOINTED EQUINE ETHICS AND WELLBEING COMMISSION

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Societies' attitudes are changing and consequently evidencing the prioritisation of equine welfare through positive actions, clearly communicated, is critical. All equestrians have a direct but also an indirect influence on equine welfare, specifically around the quality of the horse's life experience from its breeding, early management, training practices, experience at competitions, through to end of career/end of life. The equine community's desire to sustain equine participation in sport and leisure must address ethical concerns, and the need for equestrians to recognise that they have an individual and collective responsibility for ensuring that equine welfare is prioritised, especially where horses are involved in sport. The Equine Ethics and Wellbeing Commission was formed by the FEI to address equine welfare in sport, and potential impact on social licence to operate (SLO). Following extensive stakeholder engagement, including three large surveys, workshops, and presentations as well as taking into consideration the available research evidence, the Commission provided the FEI Board with their final report in Mexico in November 2023. The report serves as a blueprint for future-proofing equestrian sport, proposing a vision for a Good Life for Horses, and a need to address six areas of focus identified as being of importance to equestrian stakeholders, with 30 recommendations provided to address welfare risks, and issues related to ongoing social acceptance. The FEI Board will now consider the report before providing a proposed plan of action to be discussed at the FEI Sports Forum in April this year. Whilst the final report has not yet been published by the FEI, this presentation will provide conference attendees with the opportunity to hear about the work that has led to the Final report, some of the key findings and its relevance to all equestrians and equestrian organisations.

Lay person message: Horse welfare matters to our society. To understand perceptions from within the equestrian world and the general public, several surveys were undertaken alongside a search of the available science literature. The results were used to provide an evidence based final report for the FEI Board addressing equine welfare in sport. Some of the results will be discussed in this presentation with reference to horse use in sport and leisure.

Keywords: Horse welfare, sport horse, FEI, equine ethics, social licence

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PAS1

REPORTED AGONISTIC BEHAVIOURS IN DOMESTIC HORSES CLUSTER ACCORDING TO CONTEXT

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Agonistic behaviours are often directed at other animals for self-defense or to increase distance from valued resources, such as food. Examples include aggression and counter-predator behaviours. The domestic horse can face training and management practices that, ethologically, are out-of-context and may be associated with pain, confusion or fear. Agonistic responses can endanger personnel and conspecifics. They are traditionally considered to be undesirable and worthy of punishment; a response that can often make horses more dangerous. The current study used data from the validated online Equine Behavioural and Research Questionnaire (E-BARQ) to explore agonistic behaviours (as reported by the owners) of 2,734 horses (1674 purebred horses and 1060 crossbred horses). With a focus on the ridden horses, the behaviours of interest in the current study ranged from biting and bite threats, kicking and kick threats to tail-swishing as an accompaniment to signs of escalating irritation when horses were approached, prepared for ridden work, ridden and hosed down (e.g., after work). The analysis of responses according to the context in which they arise included a dendrographic analysis that identified five clusters of agonistic behaviours among certain groups of horses and a principal component analysis that revealed six components, strongly related to the five clusters. Taken together, these results highlight the prospect that the motivation to show these responses differs with context. The clusters with common characteristics were those observed in the context of: locomotion under saddle; saddling; reactions in a familiar environment, inter-specific threats and intra-specific threats. These findings suggest the roles of potential fear, pain and frustration in such unwelcome responses and challenge the simplistic view that the problems lie with the nature of the horses themselves rather than historic or current management. Improved understanding of agonistic responses in horses will reduce the inclination of owners to label horses that show such context-specific responses as being generally aggressive. A good life for a horse often begins with improving owners' understanding of their horses' behaviour.

Lay person message: Horses respond to threats by moving away or, if that is not an option, by behaving in ways that deter the threat or move it away. These responses that help to reduce the threat are regularly labelled aggression, but this overlooks the motivation that underpins the responses which are often simply forms of defense. This study used an online questionnaire to ask about the management, training, and behaviour of horses in owners care, focusing on the results of 2,743 ridden horses. A good life for a horse often begins with improving owners' understanding of their horses' behaviour.

Keywords: Aggression, defence, distance-increasing behaviour, resource-guarding

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PAS2

SOUND ENRICHMENT EFFECTS ON THE WELFARE OF STABLED HORSES

Chloe Bolanos[1], Essam Mahmoud Abdelfattah[2], Susan Keen[3] and Amy K. McLean[1]

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Horses that are stabled spend most of their day standing with little to no enrichment. This may lead to the expression of frustration behaviours and other abnormal behaviours. Research in horses and other captive animals suggests that environmental enrichment may reduce the expression of frustration behaviours, such as pawing or kicking, and increase naturalistic behaviours, such as foraging. Sound is one form of environmental enrichment that has been associated with reduced abnormal behaviour expression. As frustration and abnormal behaviours can be used as indicators of past or present welfare issues, sound was assessed for effectiveness as a tool to improve welfare in stabled horses. This study aimed to investigate if sound enrichment decreased frustration behaviour compared to the control periods (Pre and Post-Enrichment). A second objective investigated which sound was an optimal environmental enrichment tool to improve the welfare of stabled horses. Behavioural observations were done on stabled warmblood horses (n=6) for two weeks in 1-hour periods twice a day (12:00-13:00, 16:00-17:00). The expression of several behaviours was measured, including foraging, frustration, social interactions, and stereotypic behaviours across five different sounds (Jazz, Country, Nature Sounds, Lullaby and Classical) against a Pre- and Post-Enrichment Control Day. Statistical analysis was performed comparing differences between days using a mixed-effects logistic regression model in Stata, and significance was set at $p<0.05$. Frustration behaviour expression was significantly increased ($p<0.05$) when jazz music was played compared to the Pre-Enrichment Control Day. Furthermore, frustration behaviour expression was significantly decreased ($p<0.05$) from pre-enrichment to post-enrichment, thus displaying that sound enrichment may be a tool to improve the behavioural welfare of stabled horses. Foraging behaviour was significantly increased when nature sounds were played compared to pre-enrichment, while a significant decrease in foraging behaviour was observed when jazz music was played. These results suggest that sound enrichment may decrease the expression of frustration behaviour overall and that nature sounds may be the optimal form of sound enrichment to promote naturalistic behaviours such as foraging. Further research may assess the effectiveness of sound enrichment in reducing other equids' expression of frustration behaviour

Lay person message: Equids exhibit frustration behaviours, such as pawing or kicking, due to management practices and confinement, thus indicating a past or current issue with welfare. To improve welfare and create a good life for horses, sound as a form of environmental enrichment may be used to decrease the performance of frustration behaviour. Based on the results of the present study, sound enrichment exposure decreases frustration behaviour in stabled horses. Furthermore, nature sounds may be an optimal sound as they increase foraging. Assessing sound enrichment further may help create a good life for horses by promoting natural behaviour and preventing abnormal behaviour.

Keywords: Sound enrichment, environmental enrichment, welfare, frustration, foraging, horses

Return to programme

PAS3

THE COMPARATIVE EFFECTS OF THREE ENRICHMENT ITEMS ON THE PHYSIOLOGY AND BEHAVIOUR OF STALLED HORSES (EQUUS CABALLUS)

Miranda Brauns[1], Ahmed Ali[2] and Amy McLean[1]

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Domestic horse management contrasts with their natural environment and behavioural needs. Small stalls and regulated feedings increase standing, reduce foraging, and risk well-being. Enrichment seeks to encourage naturalistic activity budgets; however, effects on physiology are under-researched as well as how item type and provision time influences enrichment effects. This study analyzed physiology and behaviour of nine stalled quarter horses when provided hay feeders (High Country Plastics 16”), activity balls (Horsemen’s Pride 25”), and mirrors (24”x24”) to better understand effects on welfare. Horses were randomly divided into three groups and monitored over three trials, with each involving a control day and enrichment day. Each group received a different enrichment item per trail. 30-minute observations were conducted four times per day (morning, noon, afternoon, evening). Enrichment was removed between observations and during 5-day washout periods between trials. Heart and respiration rate were recorded during observations approximately every 21 seconds through Nightwatch® Smart Halters™; behaviours were scored via video recordings in BORIS using focal instantaneous scan sampling at 30-second intervals. Observers were not blind to treatments. Enrichment effects, item type, time-of-day, and possible interactions on each variable were tested using generalized linear mixed models; Tukey’s HSD multiple comparison procedure were used for post-hoc comparisons (statistical significance $p \leq 0.05$). Enrichment significantly increased heart rate from control ($p=0.03$), and the hay feeder showed strongest effects among enrichment items. No significant differences in respiration rate were recorded. Provision time did not affect heart rate within any treatments except the mirror which was significantly lower in the evening compared to other times ($p=0.02$). Enrichment, regardless of type, encouraged more naturalistic activity budgets including significantly increased foraging ($p=0.01$) and locomotion ($p=0.03$) and significantly decreased standing alert ($p=0.04$), standing rest ($p=0.03$), social interactions ($p=0.02$), and frustration behaviours ($p=0.03$). While all items showed many effects and appeared effective enrichments, significance varied among individual treatments, suggesting item type may affect different behaviours. The hay feeder’s activity budget more closely resembled that of wild horses, suggesting it may more effectively fulfill overall behavioural needs. Effects occurred throughout the day, with larger differences from control at noon and afternoon, compared to morning and evening; so owners should prioritize giving enrichment outside routine meal provision times. In summary, providing enrichment positively effects physiology and behaviour and may improve emotional states, behavioural needs, health, and overall welfare of stalled horses. Further studies with larger sample size are recommended to explore different items, management, and long-term effects.

Lay person summary: Most horses have limited turnout and spend most time standing in stalls. Enrichment toys can help improve welfare; therefore, this study compared how different enrichments (hay feeder, activity ball, mirror) affected horse behaviour and physiology. Enrichment increased heart rate, grazing and movement, and decreased standing, social and frustration behaviours. Effects were stronger during midday. All items were effective, though hay feeder had stronger effects, and may be provided to improve mood, behaviour, health, and welfare.

Keywords: Equine welfare, equine behaviour, enrichment, foraging, heart rate, smart halter

Return to programme

PAS4

CAN DIFFERENTIAL REINFORCEMENT OF AN INCOMPATIBLE BEHAVIOUR DURING MOUNTING IMPROVE RIDER SAFETY AND EQUINE WELFARE?

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Lesson horses that exhibit avoidance behaviours at the mounting block (e.g., moving away/refusing to stand for mounting) may receive excessive corrective measures (e.g., jerking of the reins, yelling) due to rider frustration. Often, these behaviour patterns persist, since they are inappropriately rewarded by either a wrong sequence of negative reinforcement (e.g., rein pressure), or ineffective attempts at positive reinforcement (e.g., offering a treat from the nearside with treat-seeking resulting in the horse spinning away from the mounting block). This can result in an unsafe situation for the inexperienced rider, unsuitability for the program, and/or a decreased quality of life for the horse. This study tested whether undesirable mounting block behaviour could be extinguished using differential reinforcement of an incompatible behaviour (DRI). Here, the reinforced behaviour (turning to receive a treat offered opposite the mounting block) is incompatible with movement away from the mounting block. Eight horses were identified by experienced Delaware Valley University riding instructors as consistently difficult for students to mount over a six-month instruction period. Horses were videotaped at baseline, and number and types of evasive behaviours were scored over the initial one minute of attempted mounting. The intervention comprised shaping the incompatible behaviour through positive reinforcement: horses were given a treat over the wither from the top of the mounting block, making movement away from the mounting block (the undesired behaviour) incompatible with the reinforced treat-seeking behaviour. Treatment was implemented twice weekly for two months. At the end of the intervention, the mounting process was re-videotaped and avoidance behaviours were recorded and scored. Pre-treatment, horses showed a total of 42 undesired (range 2 to 12/horse) and 0 desired behaviours in the initial minute of mounting with an average time to mount of 86.25 seconds. Post-treatment, the total number of undesired behaviours was 3 (92.9% decrease) and total number of desired behaviours was 13. Strikingly, mounting time decreased by 78.6% to an average of 18.5 seconds. T-test confirmed that the decrease in total avoidance behaviours was statistically significant (P=0.004). DRI is a simple and effective way to reduce unwanted behaviour without force or special skill sets. Here, just two months of twice weekly DRI reduced undesired mounting block behaviours. This simple technique can be easily implemented in lesson programs to improve rider safety, decrease inadvertent punishment, and improve overall horse welfare facilitating a Good Life for horses.

Lay person message: Avoidance behaviour during mounting can be dangerous and lead to forceful corrections with negative impacts on horse welfare. 'Treating' a horse over the wither from the top of the mounting block reduces mounting time and avoidance behaviour. This simple technique can make mounting safer and more enjoyable for both riders and horses, improving their quality of life.

Keywords: Differential reinforcement, horse training, horse welfare, rider safety, incompatible behaviour

Return to programme

PAS5

A GOOD LIFE FOR HORSES: TEACHING HORSE OWNERS ABOUT DISEASE TRANSFER AND PREVENTION

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To ensure that horses are living their best life, physical needs must be met with adequate protections in place to prevent diseases. The Science Creates Real Understanding of Biosecurity (SCRUB) curriculum was created to provide hands-on activities to teach horse owners about biosecurity, since their animals may be at risk every time they travel or come in contact with new animals. SCRUB includes 4 modules with activities addressing concepts of disease transfer and prevention methods. SCRUB was developed for 10-18-year-old youth but has been effectively incorporated into workshops for recreational and professional horse industry members. SCRUB outlines all background material, objectives, timing, activity steps, and reflection questions for instructors. Module 1 focuses on cleaning and disinfecting, beginning with hand washing effectiveness, then challenging participants to clean typical barn surfaces. Module 2 explores direct/indirect disease transfer incorporating a simple, but powerful activity demonstrating the speed of disease transfer between animals, and introduces zoonosis, fomites, and vector concepts. Module 3 addresses types and effectiveness of vaccinations, stressing the need for proper handling and storage using a cooler building activity. Module 4 incorporates previous lessons by identifying and creating strategies to prevent disease transmission in a horse facility. In spring 2023, a pilot project evaluated pairs of 4th grade students (9-10-years-old) answering two qualitative questions (What does biosecurity mean? and How can animals pass an illness to another?) before and after a SCRUB hands-on lesson. Of the 75 completed surveys, 85% (n=64) of paired students surveyed showed an improved ability to define biosecurity at the end of the lesson. Most student's responses changed from "don't know" before the lesson, to variations of "to prevent sickness" or "to not spread diseases" following the lesson. Additionally, even where the pre-response was correct (19%), the post response was correct but different (39%), providing some additional detail or adding the term "vector" (2%), thus, 63% of student pairs surveyed improved their ability to describe how animals can pass illness following the SCRUB lesson. Educating horse owners about biosecurity and disease prevention is a key to providing a good life for horses. The SCRUB curriculum is available at no cost online and provides an "easy-to-consume" way for youth and adults to learn and implement these fundamental concepts. A pilot project has shown SCRUB to be effective in teaching concepts of biosecurity with more than six in 10 student pairs better able to define how animals can pass an illness following the SCRUB lesson.

Lay person message: A Good Life for horses depends on ensuring adequate protections are in place to prevent disease and illness. The SCRUB curriculum is a four-module educational series highlighting the need for biosecurity and animal disease prevention appropriate for individuals of all ages. The curriculum is freely available online and provides all the information needed for any instructor (with or without biosecurity and animal knowledge) to conduct the lessons. By educating horse owners on disease transfer, disease spread potential can be decreased, thus increasing the ability to provide a good life for all horses.

Keywords: Disease, biosecurity, educational resource, healthy horse, digital

Return to programme

PAS6

EVALUATION OF WHIP USE IN THE CROSS-COUNTRY PHASE OF FEI EVENTING COMPETITIONS

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Whips are used by riders as a positive punishment for the horse and traditional equitation theory states they can also support leg aids and direction of the horse. Within racing the use of the whip has not been associated with improved performance. Questions have been raised around the impact whip use has on equine welfare and whether any whip use can be ethical. This study aimed to describe whip use riding cross-country (XC). An observational analysis of 200 videoed XC rounds at FEI 2*-5* level was undertaken. Variables recorded included fence type, fence number, number of hits, stage of jump, faults occur, viable reasons for use and horse's reaction. A whip was carried by 99% (n=198) of riders, however only 40% used it during the XC round. The riders were 2.17 times more likely not to use the whip than hit the horse. A total of 122 uses were recorded with 62% of riders only using the whip once during the round: 82% on the shoulder, 18% on hindquarters. 79% of whip use occurred before a jump, 15% after a jump and only 2% at the jump. Fence type was significantly strongly associated with whip use (r_s= 0.915, n=97, p<0.001) with whip use being more common at water, skinny and corner fences. In 13% of occasions faults occurred at the same fence the whip was used. 24% of whip use occurred where the horse observably hesitated and in 49% of occurrences, no obvious reason for use was observed. The majority (61%) of the horses displayed no visible reaction to the whip use. Of the horses that did visibly react to the whip use, the most common reactions observed were bucking, rearing or ears pinned back. There was a strong positive association between number of strikes and the horse showing a visual reaction (r_s= 0.913, N=97, P<0.001). Most riders carried a whip but did not use it during the XC rounds. Whip use was most common before a fence and no observable reason for use was seen in 49% of cases, suggesting riders are not only using it as a punishment. Whilst over half of horses did not show any visual reactions to the whip, there might still a negative impact on the horse's welfare status, and public perception of whip use threatening Eventing's social license. Whip use may be due to a misunderstanding of equine learning theory, rider psychological reasons, or visibly imperceptible horse behaviours. This study suggests that more research to understand why riders are using their whip is required.

Lay person message: Most XC riders carry whips, but not all riders used them. Most whip strikes occurred before the jumps and on the shoulder. There was a strong link between whip use and the type of jump. Several horses showed no visible reaction to the whip, however, some horses reacted with behaviours like bucking or rearing. The findings raise concerns that whip use may not support learning theory and that more research into their use in eventing is needed.

Keywords: Whip, cross-country, eventing, social license, training

Return to programme

THEME 2: RIDING AND TRAINING, TACK AND EQUIPMENT sponsored by University of Guelph

PL2

EVIDENCE-BASED HORSE TRAINING

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'First principles' is a term used largely in health sciences, such as human and animal medicine. Along with 'pattern recognition', a knowledge of first principles provides indispensable guidelines in the assessment of health and behaviour because they are derived from deductive thinking and experimentation. The framework that underpins horses' health, cognition, and safety arises from their evolution as group-living prey mammals of the open grassland/shrubland niche. In equitation science, first principles pertain to the fundamental mechanisms that define the horses' telos. Therefore, it is important to train and manage horses in a way that aligns with their innate learning framework and natural drives. Twenty years ago, the common ground of these ideas galvanised a handful of ethologists interested in horses and consequently gave rise to the International Society for Equitation Science (ISES).

The peer-review process of the ISES training principles first began following the publication in 2002 of *Horse training the McLean way* which listed 10 training principles distilled from Andrew McLean's PhD thesis titled: *The mental abilities of the horse, and the consequences for training*. This ultimately led to his collaboration with Paul McGreevy and the 2007 publication of *The roles of learning theory and ethology in equitatio*n in the Journal of Veterinary Behaviour. This article refined the early principles to 8 evidence-based general principles of learning and ethology that are relevant to all human interactions with horses. These principles are intrinsically and inflexibly representative of the horse's telos. As it does now, it made very clear sense back then that all our interactions with horses, no matter what we do with them, must align with these basic principles to make human-horse interactions as humane, safe and efficient as possible. Over the last decade, the ISES "first principles of training" have been further developed to 10 principles and again refined through peer-reviewed amendments as follows:

1. regard for human and horse safety;
2. regard for the nature of horses;
3. regard for horses' mental and sensory abilities;
4. regard for emotional states;
5. correct use of desensitisation methods;
6. correct use of operant conditioning;
7. correct use of classical conditioning;
8. correct use of shaping;
9. correct use of signals or cues;
10. regard for self-carriage.

This presentation explores these 10 principles, highlighting their growing validation through latest research. Advances in welfare science have further emphasized the importance of these principles in enabling horses to fulfill their needs and live a fulfilling life as far as possible in human-horse activities. Against the backdrop of growing threats to the horse industry's SLO, sustainability lies in the education of horse people and their capacity to adapt their diverse methodologies to align with the 10 principles of training. Staying up-to-date with the latest research, practitioners of equitation science must inevitably make informed decisions to promote a future where horses and humans enjoy a harmonious and mutually beneficial relationship whether it be in leisure, sport or any other human-horse interaction. *Return to programme*

RP5

THE EFFECT OF NOSEBAND TIGHTENING ON EYE TEMPERATURE AS A MARKER OF STRESS

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Tight nosebands exert high levels of pressure to bone and soft tissue under the noseband, and reduce oral comfort behaviours, such as mouth opening, in response to bit pressure. They help riders avoid penalties in some disciplines while increasing their ability to apply unavoidable intrabuccal discomfort for steering and deceleration. Clearly, excessively tightened nosebands compromise horse welfare. The aim of the current study was to investigate how three different levels of noseband tightness affect eye temperature, as a physiological stress response. Noseband fittings, allowing 2.0, 1.0 and 0.5 fingers under the noseband at the frontal nasal plane, were applied to 12 horses in a random order while a digital tightness gauge recorded noseband tension at the frontal nasal plane. A FLIR thermographic camera measured eye temperatures, from approximately 1metre distance, for 10 consecutive measurements at each fitting. After Kolmogorov-Smirnov tests for normality of the thermography data, SPSS calculated the mean of all 10 eye temperatures for each horse at each fitting and the overall mean for each tightness setting. ANOVA and pairwise comparisons with Bonferroni adjustments for multiple comparisons were conducted to analyse temperature differences between treatments. Noseband tensions ranged from a mean of 0.6N (± 0.2) at the loose fitting (2 fingers) to 63N (±4.0) at the tightest (0.5 fingers). Noseband tightness had a significant effect on eye temperature ($F(3, 440) = 4.32$, $p<0.01$). Specifically, the loose fitting (2 fingers) was associated with significantly lower than eye temperature than the mid-level fitting ($p<0.05$) and the tightest fitting ($p<0.01$). The noseband tension measurements recorded may explain the significant increase in eye temperatures found at high levels of noseband tightness. Given previous evidence of correlations between salivary cortisol concentration and eye temperature, the findings, which echo those of other researchers, provide more evidence that stress is associated with tight nosebands. These findings should help to guide noseband regulations in aiming to ensure a good life for horses.

Lay person message: Excessively tight nosebands jeopardize horse welfare by putting pressure on tissues, restricting mouth movements and possibly heightening discomfort from bit pressure. In this study, we looked for signs of stress, as indicated by changes in eye temperature, when nosebands were tightened, from loose to very tight. Eye temperatures increased significantly when the nosebands were tightened from loose to the two tightest settings, suggesting that horses underwent a stress response as a result of this treatment.

Keywords: Noseband tightness, eye temperature, infrared thermography, horse welfare, stress

Return to programme

RP6

HARNESS RACING THROUGH THE LENS OF ANIMAL WELFARE SCIENCE: REIN TENSION AND PERCEIVED DRIVEABILITY

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Horse welfare in harness racing (HR) and equestrian sports in general is in the spotlight of public debate and the HR sector itself is calling for significant improvements. Scientific data support this concern, e.g. in Finland and Iceland, 35-80% of horses compete with mouth injuries. Inappropriate equipment and/or excessive rein tension (RT) are probable causes. Thus, it is important to measure RT in HR horses, drivers' perceptions of RT and the characteristics of optimal driveability. Together, these can enhance driver-horse communication and ultimately horse welfare, thereby promoting a sustainable HR industry. RT was recorded for left/right reins in 12 Standardbreds (mean 6.3 ± S.D. 0.8 years old) in a simulated training-race over 2140 m (trotting speed 11-14 m/s) on a public racetrack to determine: 1) variation/magnitude of RT, 2) how RT relates to perceived driveability, and 3) incidence of acute lesions in the horses' mouth. All 12 drivers reported how they experienced the horse in terms of softness in the mouth, responses to rein signals, and perceived RT. RT was analysed in linear mixed models with race section as a fixed effect and horse as a random effect. Results showed that RT (estimated stride median) was between 80-86 N per rein on average during the first half of the race, and 50-63 N during the second. Peak stride median RT was 115-130 N during the race, descending to 67 N at the finish. Drivers perceived RT on average as 30 kg (the approximate equivalent of 290 N), and all drivers said the horse was leaning on the bit. Nevertheless, 8/12 drivers experienced the horse as being soft in the mouth. Driveability was scored between 2.5-9.6 (median 7) on a scale from 1 (poor) to 10 (excellent). Before racing, all horses were free of soft tissue damage around the bit, but mouth lesions were found in 8 horses immediately after the race. Median RT (racing trot) during competition was similar to race-training (51-62 N) but peak values were higher than during training at the home-racetrack (73-87 N). Harness racehorses are exposed to higher RT than previously reported in riding horse studies. What is optimal RT in terms of driveability, equipment, driver safety and horse welfare are questions that remain and are being studied in a follow-up project. A good life for horses in HR depends on their being exposed to fewer injurious forces such as those reported here.

Lay person message: Rein tension data combined with drivers' experiences can support the HR industry in making informed decisions based on horse welfare. Ideally, drivers should be aware of tension they apply and horses' responses to discrete signals. Such awareness could help to avoid relying on harsher equipment when reactions to rein signals diminish. This study confirms that rein tension data have a place in providing an evidence-base for objectively defining 'contact', especially since rein tension is perceived differently by multiple drivers.

Keywords: Trotter, harness racing, rein tension, driveability, welfare

Return to programme

RP7

ORAL CONFLICT BEHAVIOUR IS A POTENTIAL INDICATOR OF ORAL LESIONS IN DRESSAGE HORSES

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The welfare of sports horses is debated both within and outside the horse community. For example, the frequent occurrence of oral lesions (ulceration) poses a threat to a good life for competition horses. Lesions may be caused by inappropriate training methods and ill-fitting equipment. Increased knowledge of behavioural signs of discomfort in horses can increase awareness by riders, trainers, officials, and competition judges, which is a first step to reduce the occurrence. This study included 11 warmblood dressage horses competing at upper national level (Intermediaire I; 5 mares, 2 stallions and 4 geldings; ridden by 8 female and 3 male riders). The horses were randomly selected (from a total of 22 horses) for a routine inspection for oral lesions immediately after leaving the dressage arena at competition. The inspector made the horse open its mouth with the fingers and examined the oral commisure, the bar and cranial part of the buccal mucosa from both sides. Five of the 11 horses were found to have ulceration of the skin and/or mucosa at one or both commissures of the lips. The pathology of the lesions was consistent with pressure wounds. An experienced observer who was blind regarding the outcome of the oral examination, scored oral conflict behaviour (e.g. opening of the mouth, i.e. with clear separation of the teeth) in the 11 horses from official video recordings available online from the event. The frequency of mouth opening ranged from 8 to 59 during the approx. 5.5 min dressage program. Due to the position of the official cameras, the mouth of the horses was only visible for approx. 2/3 of the program for all horses. Horses with oral lesions had a significantly higher frequency of mouth opening compared to horses without oral lesions (t-test, mean ±SEM; lesions: 34.6±6.7 vs. no apparent lesions: 12.2±2.4, $t(9)=3.4$, $p=0.008$). The frequency of other conflict behaviours did not differ significantly between the groups (e.g. tail swishing: MWU-test, median [25;75%]; lesions: 25 [14;27] vs. no apparent lesions: 10 [6;24], $U = 7.0$, $p=0.18$). It is concluded that oral conflict behaviour may be a useful indicator of oral lesions. Further studies are needed to investigate behavioural signs of discomfort in riding horses, as behaviour can be an early predictor of compromised welfare. Increased awareness of subtle behavioural signs is an important first step towards improved sports horse welfare.

Lay person message: A good life for sports horses requires that they are trained and competed without discomfort and pain from ill-fitting equipment or inappropriate training. However, many sports horses have oral lesions, which is a source of pain and a welfare concern. This study found that dressage horses with oral lesions showed more oral conflict behaviour (mouth opening) during a dressage competition compared to horses without lesions. Increased awareness of behavioural indicators can improve sports horse welfare.

Keywords: Oral lesions, conflict behaviour, welfare, dressage, sports horses, behavioural indicators

Return to programme

RP8

EQUINE LEARNING BEHAVIOUR – ANALYSIS OF EQUESTRIANS´ KNOWLEDGE LEVEL

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Effective human-horse interaction is pivotal for successful horse training. However little is known about the extent to which equestrians have specialist knowledge about the learning behaviour of horses and put this knowledge into practice. Using an online survey (n=474 complete responses), the aim of this study was to obtain a general overview of the level of knowledge of equestrians mainly in Germany of the learning behaviour of horses. In addition, this study explored whether differences exist between leisure riders and people with a professional affiliation to horses. Group comparisons between professional and leisure riders, as well as different professional activities and training were carried out using ANOVA analyses. In general, 44.3% of the respondents answered 60 – 80% of all questions correctly; 16.7% knew 80 - 99% of the answers and 0.4% achieved 100%. Although the definitions of the various forms of learning were largely assigned correctly, only 30.4% of respondents were able to assign all definitions correctly. In particular, the assignment of the definitions of positive and negative reinforcement and punishment shows clear knowledge deficits: 18.1% of participants were able to correctly assign all definitions, while 42.8% were able to correctly assign only one definition. It was found that people with a professional connection to horses had a significantly higher level of specialist knowledge in individual areas (learning behaviour; learning methods and definitions R+/R-/P+/P-; all $p \leq 0.01$). However, this was not reflected in the overall result. Significant differences were also found concerning the type of vocational training and professional activity, e.g. people with an apprenticeship related to the German equestrian federation had a significantly lower level of total knowledge ($p \leq 0.05$) than people with other vocational education; persons running a boarding stable had a significantly lower level of knowledge in learning behaviour ($p \leq 0.05$) and learning methods ($p \leq 0.05$) compared to people working as trainer or with other profession. Results indicate a considerable need for novel methods and action in terms of knowledge transfer for equestrians as well as the implementation of the knowledge in practice. Well-founded specialist knowledge, practical experience and appropriate action can reduce potentially dangerous situations, simplify training situations, and explain or change certain (undesirable) behaviours. The various forms of learning can be used specifically in training situations. Knowledge of the horse's learning behaviour and appropriate application contributes significantly to animal welfare and the safety of horses and humans.

Lay person message: In the leisure riding sector as well as in the professional sector, there are considerable deficits in knowledge regarding horses' learning and its transfer from theory to practice. Since knowledge about the horses´ learning behaviour and appropriate application contributes to animal welfare and the safety of horses and humans, there is a great need for action to close these gaps. The relevance of scientific findings for practice should be emphasized and the link between science and practice should be focused on ensuring a Good Life for horses.

Keywords: Learning, horse-human interaction, animal welfare, equestrian knowledge, training

Return to programme

THEME 3: THE EMOTIONAL LIFE OF THE HORSE sponsored by World Breeding Federation for Sport Horses

PL3

DETECTING POSITIVE EQUINE EMOTIONS TO ASSESS QUALITY OF LIFE

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The subjective experiences of animals as they navigate their lives is critical to their quality of life. Subjective experiences are based on emotions which are short term psychological states produced by interactions between environmental stimuli, neurophysiological and physiological responses; and moods, which reflect the longer-term cumulative effect of recently experienced emotions. The valence of emotions and moods - whether they are positive/pleasant versus negative/unpleasant, and the ratio of positive to negative emotions are key to whether the animal has a good life. Research has shown that humans who experience a preponderance of positive emotions report higher levels of life satisfaction as well as lower rates of morbidity. There are little data on whether the same is true of horses, however when given the opportunity, horses make choices to that result in positively valanced emotions and avoid those that induce negative emotions. Interacting with horses undoubtedly indices positive emotions in people, however it is less clear that horses' subjective experiences of interacting with humans are equally positive. To support a holistic assessment of equine quality of life, it is therefore essential that positive emotions can be accurately detected and identified.

The expression of positive emotions by horses can be subtle and even difficult to detect, particularly during activities such as riding where the use of aversive techniques such as negative reinforcement and positive punishment are likely confounding. The absence of indicators of negatively valanced emotions do not automatically mean the horse is experiencing positive emotions. A Good Life for horses is one in which, on balance, their experience of housing, training and competition results in a higher proportion of positive emotions and mood states than negative ones. While an extensive body of research has identified modifications to housing, training and equipment that may decrease indicators of negative emotions, there are a lack of data on whether such changes also lead to horses experiencing positive emotions.

Horse owners' knowledge of equine emotions varies and research reveals that participants may have low accuracy differentiating between positive and negatively valanced emotional states in some industry contexts. A common example is interpreting physiological arousal during a competition as evidence the horse is expressing enjoyment. Fortunately, technologies that have been successfully applied to detect negative equine emotions such as pain can also be applied in the field of positive emotions. Structured, validated observational tools such as the Equine Facial Action Coding system have been used to detect subtle facial indicators of positively valanced emotion such as positive anticipation prior to receiving a food reward. Existing physiological measures such as heart rate variability, eye temperature and spontaneous eye-blink rate combined with evidence from behaviour ethograms have also been associated with positive emotions. These approaches are now being harnessed to artificial intelligence (AI) with the potential to provide real-time detection and monitoring of equine emotional state.

AI models offer several capabilities that can improve the sensitivity and efficiency of methods to detect positive emotions in horses. They can process large data sets to detect behaviours and facial characteristics that may not be readily identified by human observers. AI models used in emotion detection in humans and animals use supervised machine learning where the model is trained on images that have been manually labelled as expressing an emotion of interest. Over multiple iterations, the machine 'learns' to detect and distinguish between images that include characteristics of the target emotions. However, there are several methodological

and interpretive questions arising from the use of AI in this field which need to be addressed to ensure that the results of AI equine emotion detection systems are reproduceable and reliable.

The first question that arises is that of 'explainability'. Many AI models are essentially a 'black box', meaning that the rationale behind the machine's decisions is not known. This is a hotly debated topic within the wider AI world because a critical aspect of the scientific method is that findings can be explained and replicated. Second, to date, the evidence base for specific positive equine emotional states on which researchers train AI machines is small. There is no standardised index of the range or characteristics of positive emotions horses experience, and between studies there is variability in the ethograms and definitions used to identify individual emotions. This introduces the risk that unintentional observer bias will lead to unacceptably low 'ground-truth' accuracy during labelling of data on which the AI is trained. That is, based on its training, the model may correctly label an image as depicting a specific emotion, yet the horse may be actually experiencing something different. This is a particular risk for subtle or less intense positive emotional states that are more open to differing interpretations between observers. The black box nature of AI algorithms may then make detecting and rectifying these errors difficult.

To address these risks, the equitation science community could collaborate on the development of robust standards for the assigning of emotion labels to AI training data. At a minimum, labelling of these data should be undertaken by trained observers using structured and reproducible identification systems. Additionally, context is critical for inferring positive emotions in horses, and it is essential that the context in which AI training images are collected is reported in studies to improve reproducibility. The data sets used to train AI to date have been relatively small, and undertaking collaboration within the research and citizen science community could increase the size of training data sets and thus the robustness of the resulting output. For now, while there is a lack of validated evidence regarding the range and features of specific positive equine emotions, caution should be exercised in the definition of emotional states for AI training data. Anchoring all interpretations of emotional state for AI image labelling to equine telos could improve the accuracy of training data labelling and consequent output of AI models.

The end goal of this research could be the development of automated and robust technologies that can be used by ordinary horse owners to accurately identify positively valanced equine emotional states. In addition, the integration of this knowledge into performance assessment during competition could ensure that equine athletes are objectively experiencing a good life including during competition. With the sport's social license to operate at risk by a public concerned about persistent evidence of breaches of horse welfare, the opportunity to accurately identify positive emotional states in horses or their absence, could underpin the implementation of necessary changes to training, competition and judging standards so that a good life for horses becomes the basis for equestrian industry practices across the world.

Lay person message: Emotions and moods are how horses experience their lives and can be positive/ pleasant or negative/unpleasant. A good life for horses is one where they experience more positive emotions than negative ones. Positive emotions in horses can be hard to identify however Artificial Intelligence could assist horse owners to know when their horse is experiencing positive emotions. A wider knowledge of positive equine emotions could be used to improve their welfare during training and competition to ensure that they live a Good Life.

Keywords: Emotion, positive emotional valence, Artificial Intelligence, horse welfare, Social Licence to Operate

Return to programme

RP9

VALIDATION OF A QUALITATIVE BEHAVIOUR ASSESSMENT (QBA) METHOD WITH QUANTITATIVE BEHAVIOURAL TESTS

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To ensure a good life for horses, we need robust methods to assess emotions. Following development of a specific Fixed List of Qualitative Behaviour Assessment (QBA) terms designed to assess emotional states in horses. We then validate the terms by comparing QBA scores to three behavioural tests using 8 mixed breed horses. Each horse was tested once in each of three tests: 1) locomotor activity for 24 hours measured by tri-axial accelerometer-based activity loggers affixed on one of three locations (head, chest, leg) or all three locations; 2) responses to a standardised unfamiliar human approach test; 3) responses to an attention bias test using an auditory stimulus (playback of a lion roar). For test 1 QBA data were collected for short video clips and compared to Total and Maximum Activity as recorded by the accelerometer. For each of tests 2 and 3 quantitative behavioural data were collected alongside the QBA assessments. Multiple linear regression was used to assess the association between quantitative measures and QBA scores. For test 1, a higher max activity recorded on the head ($F_{9,22}$=20.54, p<0.001) and leg ($F_{9,22}$=8.28, p<0.05) and higher total activity recorded on the leg ($F_{9,22}$=7.54, p<0.05) was associated with QBA scores indicative of higher arousal. A higher total activity recorded on the chest was associated with QBA scores indicative of lower arousal (F9,22=5.51, p<0.05). For test 2, only 1/8 horses reacted by avoiding the human approach. Low mood QBA scores were associated with not eating and avoidance responses ($F_{2.21}$=4.66, p=0.02). For test 3, all horses exhibited a vigilance response on exposure to the lion roar and were more reactive after the stimulus than before (t=-1.97, d.f.=7, p=0.04). However, horses that were most reactive to the stimulus and took longer to resume normal behaviour were associated with QBA scores indicative of a low mood state. Overall, our data suggest that QBA is sensitive to variations on horse responses to tests designed to manipulate emotional state and that QBA scores varied with horse response in a meaningful way. These data show that QBA can provide valuable information on a horse emotional state that can be applied in a variety of different contexts. QBA thus has the potential to provide a unique insight into equine emotional state, both positive and negative. This will inform ways to manage and interact with horses to ensure they have a good life.

Lay person message: We demonstrated that using a novel Qualitative Behaviour Assessment (QBA) method provides meaningful information on a horse emotional state by validating this measure against other behavioural indicators (locomotion activity, human approach test and attention Bias test). QBA is simple, easy to apply and can be used in a variety of contexts to provide valuable information on horse emotional state for welfare assessment.

Keywords: Horse, emotions**,** Qualitative Behaviour Assessment**,** validation, attention bias**,** locomotor activity

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RP10

EFFECT OF HAY FEEDING REGIMEN (LOOSE HAY RESTRICTED VS. HAY IN NETS *AD LIBITUM*) ON HORSES' EMOTIONAL STATE AS ASSESSED IN A JUDGMENT BIAS TASK

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Horses have evolved to spend up to 16 hours/day feeding. Under most modern horse husbandry conditions, hay feeding is restricted, with the potential to negatively affect horse welfare due to the inability to express this highly motivated behaviour. In husbandry systems with *ad libitum* feeding, hay is often fed in hay nets, which increase feeding time, but impede feed intake to reduce both wastage and overconsumption. The aim of the present study was to compare emotional states in horses fed with hay in hay nets *ad libitum* and with loose hay restricted. Ten individually housed horses were trained in a go/no-go task to associate a bucket in one corner of the test arena with a feed reward (S+), whereas feed was out of reach (using buckets with double bottoms), if the bucket was placed in the opposite corner (S-). After all horses completed the habituation to S+ and the training phase successfully (defined as significant difference in latency to approach S- vs. S+), the first judgement bias tests for assessment of baseline emotional state during familiar, restricted feeding (16 kg loose hay/horse and day; restricted_1) were conducted. Horses were each presented 3 times with buckets at three different intermediate positions (MS-, M, MS+), and latency to touch the bucket was recorded. Subsequently, the diet was switched for two weeks to *ad libitum* hay feeding with hay presented in hay nets (ad libitum_1), followed by another 2-week phase of restricted and *ad libitum* feeding each (restricted_2 and ad libitum_2). At the end of each two-week phase, cognitive bias was assessed again as described before. There was no evidence that horses were in a different emotional state after ad libitum_1 vs restricted_1 (Cox proportional hazards model, interaction stimulus x phase: LTR: X^2=3.566, d.f.=4, p>0.05). However, when comparing ad libitum_2 to restricted_1 or to restricted_2, horses were quicker to approach MS+ (both p<0.05), as well as M (– 3.5±0.8 sec, z=4.66, p<0.01 for ad libitum_2 vs. restricted_1 only). Results might indicate that *ad libitum* feeding leads to a (slightly and at least temporarily) more positive emotional state in horses, though the lack of difference between *ad libitum*_1 and restricted_1 suggests, this effect may only be present after habituation to feeding from such hay nets. Therefore, *ad libitum* hay feeding has the potential to impact horses' lives by improving emotional state, although potential long-term effects on physical health also need to be considered.

Lay persons message: During the second, but not the first two-week exposure to *ad libitum* hay feeding, horses showed an improvement in emotional state compared to a restricted hay feeding regimen, even though large amounts of hay were fed in the restricted diet. Since hay nets were used for *ad libitum* feeding, results may suggest that an acclimatisation period may be necessary for such positive effects to be effective.

Keywords: cognitive bias, hay, net, *ad libitum*, restrictive, emotional state

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RP11

WORKING TO REACH CONSENSUS ON THE TERMINOLOGY OF NASAL-BASED ACOUSTIC SOUNDS IN HORSES AND THE AFFILIATED EMOTIONAL STATES THEY REPRESENT

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Over the past 18 months, recordings of various nasal-based acoustic sounds (NBAS) were collected to assess current NBAS terminology. Recordings were taken with high quality recording equipment, GoPro footage, and a few cellular phone recordings. Analysis of bioacoustics through spectrograms has taken place to determine average frequencies and durations of audio recordings. Presentation of several sets of audio recordings to an audience will occur at this conference with an attempt to match the sound to the term participants feel is most representative of that sound. The following NBAS have been gleaned from multiple horse behaviour textbooks: snort, blow, snore, sneeze, and via anecdotal discussions (e.g., 'whuffle', 'snortle'). There is discussion/disagreement about which contexts these various sounds are most typically observed/heard, with multiple sources listing the terms 'snort,' 'blow,' 'snore' and 'sneeze' in apparent (if untested) unity. More recently, a publication from European researchers stated that 'snorts' could be viewed as an indicator of positive emotion in horses, stimulating greater discussion in global research groups about nomenclature for NBAS. This is not to dispute that some NBAS only take place when horses are in a relatively relaxed or positive emotional state. However, there seems to be a lack of consensus regarding what these different sounds should be called and in which contexts they are observed. An agreement in terminology and their contexts can be used by equestrians worldwide to help assess 'a Good Life for horses', whether it be in competition, recreational pleasure, or work activities.

Lay person message: Many of us have grown accustomed to the sounds that horses make. Whinnies, neighs, nickers and squeals are part of the daily repertoire when you spend time with horses. But how often do you notice the nasal-based sounds? Can you differentiate between similar nasal-based sounds without any context? Do you use equine vocal terminology interchangeably? In this interactive activity, participants will be polled on your ability to distinguish between nasal-based sounds and learn about different defining factors in the audio frequencies, duration, and environmental context. The more identifiers found to distinguish these sounds will create refinement in the terminology.

Keywords: Nasal-based acoustic sounds, bioacoustics, spectrograms, equine vocalization, terminology consensus, positive emotion

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LT1

SADDLE SYMMETRY OF RIDING SCHOOL HORSES´ SADDLES AND COMPETITION HORSES´ SADDLES

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Saddle fit has been recognised as a significant factor for the health and performance of the equine athlete. Incorrect saddle fit has been linked with back pain in horses, poor performance and poor work attitude, and has been reported as a welfare challenge by industry stakeholders. Asymmetry between saddle panels is a common problem in ill-fitting saddles, especially in British riding schools. The aim of this study was to investigate the saddle asymmetry of riding school saddles and professionally owned competition saddles with and without a rider on a stationary saddle horse. The hypothesis was that there would be a significant difference between the left and right saddle panel force and that different panel material may influence the asymmetry. A convenience sample of 43 saddles was used consisting of 25 saddles (17 general purpose, 3 dressage, 5 jump) from a riding school and 18 custom-made (13 dressage, 5 jump) saddles from professionally owned competition horses. Peak vertical saddle forces, on a stationary saddle horse were measured with a Tekscan CONFORMat pressure mat. Ten seconds of data were recorded at a frequency of 100Hz. For the riding school saddles, the same female rider was used, for the professionally owned saddles, data were collected with a rider in their own saddle. For mean saddle forces with and without rider, symmetry indices (SI) were calculated using the formula: SI (%) = 100[(XR-XL)/0.5(XR+XL)], and Wilcoxon matched pairs signed-rank tests and paired t-tests were used for tests of difference ($p<0.05$). 95% of saddles showed asymmetrical saddle forces without a rider. 77% showed greater pressure on the right panel. Riding school saddles had SI=65.12 (SD±39.4), competition saddles SI=53.85% (SD±24.5). A significant difference was found between mean left and right panel force in riding school saddles ($p=0.001$) and the competition saddles without a rider ($p=0.001$) and with a rider ($p=0.004$). The addition of the rider caused the asymmetry in 64% of riding school saddles and 22% of competition saddles to be greater on the left panel. 50% (n=34) of all wool flocked saddles had higher force between measurements, whereas saddles filled with synthetic materials (n=8) showed no difference. Saddle asymmetry was influenced by panel filling material and the rider. More research investigating the influence of different panel filling material is warranted, focusing on the breakdown, movement of the material and influence of rider. This could improve the fit and comfort for the horse, reduce back pain and thereby improve equine welfare.

Lay person message: Saddle fit plays a crucial role in the well-being and performance of horses. Poorly fitting saddles can lead to reduced performance, back pain, and poses welfare concerns. This study assessed saddle asymmetry in riding school and competition saddles, both with and without a rider on a stationary saddle horse. A sample of 43 saddles, 25 from riding schools and 18 competition saddles, were analysed using a pressure mat. The results revealed that 95% of saddles were asymmetrical without a rider, showing higher pressure on the right panel. Saddle asymmetry was influenced by panel filling material and the rider.

Keywords: Saddles, panel filling, competition, riding school, symmetry

Return to programme

LT2

ASSESSING RESPIRATORY PATTERN CHANGES USING A MICROPHONE AT HIGH-SPEED TROT IN STANDARDBRED TROTTERS – A PILOT STUDY

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Horses are exceptional athletes with high respiratory capacities. Despite this, the respiratory system can become a limiting factor for equine performance resulting in compromised equine welfare when unnoticed. This becomes particularly relevant for horses used in sports that require great speed and/or stamina. Measuring respiratory rate (RR) during exercise is challenging due to practicalities and motion artifacts. Studies have used average RR as an outcome measure, without looking at how it may change during training. More detailed information on RR and breathing patterns can help to understand the horse's workload, adaptation to training and to identify possible respiratory pathologies. The aim of this pilot study was to determine RR and to further explore parameters associated with the breathing patterns of standardbred warmblood trotters at high-speed trot, and whether this changes during a training session. Thirteen standardbred warmblood trotters were equipped with an omni-directional microphone (ECM-LV1, Sony, 44100 Hz), voice recorder (ICD-PX470, Sony) and a GNSS node to collect speed. The voice recorder was attached to the cheek piece of the bridle and the microphone was placed near the nostrils. Data were collected during a standardized exercise test with high-speed trot being the focus for this pilot. All horses were in active training and driven on an oval track with a sulky. High-speed segments were identified, and expiration events were manually labelled based on sound and audio graphs. The 50%-duration mark was identified creating a first and second half used for analysis. Statistical analysis was performed using Linear Mixed Models (fixed-effect = 'segment', random-effect = 'horse', α=0.05). Average speed was 36.9±6.2 km/h. The RR was higher in the first half of the segment compared to the second half (106±4 resp. 101±4 breaths/minute, p=0.03), with average RR values ranging from 73 to 127 breaths/minute. Breathing out duration differed with 0.15±0.01 and 0.18±0.01 seconds for the first and second half of the segment ($p<0.001$). Initial observations showed inter-individual differences in breathing sounds and regularity of ins-/expiration. Some horses showed very regular breathing patterns (i.e., in-out-in-out), whereas others sometimes skipped an expiration or inspiration. These results highlight the importance of studying respiratory behaviour more closely. Breathing patterns differ between horses and change within constant speeds at different points during training. Microphones can be non-invasive tools to monitor equine breathing during training sessions providing essential information on the response to training. Possible breathlessness or respiratory pathologies could be detected earlier, thus promoting equine welfare.

Lay person message: The horses' respiratory system is essential for performance and welfare, but monitoring it is difficult and rarely done. The usage of a microphone to monitor respiration during the training of trotters showed differences in expiration durations and showed various breathing patterns between horses. Measuring respiration during training can then be of added value to evaluate the response to training, but also to detect abnormalities and possible pathologies earlier in order to improve horse welfare.

Keywords: Equine, respiration, breathing patterns, high-speed, microphone, trotters

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LT3

RESPIRATORY RATE DETECTION USING NON-CONTACT INFRARED THERMOGRAPHY IN HORSES AT REST

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The respiratory rate (RR) is an essential vital sign for equine health, hence the importance for welfare monitoring. Generally, RR is counted subjectively by abdominal movement making it unreliable, labour intensive and possibly stressful. An automated tool to measure RR would provide significant benefits. Smart-textile girths (STG) with embedded sensors allow vital sign detection but require attachments on the horse. Infrared thermography (IRT), a method that detects temperature gradients, might be suitable as it allows for non-invasive and equipment-free health monitoring. This study aimed to use IRT to detect and measure RR in horses at rest by measuring temperature changes at the nostrils caused by breathing and comparing the IRT's measured RR with a STG. Eight clinically healthy horses were equipped with a STG (Smartex®, Italy) embedded with piezo-electronic stretch sensors (25Hz) for RR. One infrared camera (Teledyne FLIR, 320x240 pixels, 30Hz) was placed at a 3-metre distance with nostrils as the region of interest. Continuous data collection occurred inside a stable (20 minutes/horse) with the horse facing a corner and its body alongside the wall. Five horses were measured in a resting state and three horses underwent light exercise (10-minute walk (5.5km/h) and 5-minute trot (10.2km/h) in a horse walker). Measurements started <1 minute after exercise. For IRT, sections of >10 seconds were selected with good nostril visibility. In-/expiration was counted manually based on temperature gradients. RR from the STG was analyzed in MATLAB using peak detection. Statistical analysis consisted of Linear Mixed Models (fixed-effect = 'method*condition', random-effect = 'horse', α=0.05) and Bland-Altman analysis to determine the limits of agreement and bias between the STG and IRT. Temperature differences at the nostrils were visible on camera allowing for RR determination. One horse was removed due to unreliable data. The RR was different between the IRT and STG both at rest (19±2 breaths/minute vs. 16±2 breaths/minute resp., $p<0.001$) and after light-exercise (21±3 vs. 18±3 breaths/minute resp., $P<0.001$). Bland-Altman analysis showed a mean difference of -3 breaths/minute between the two systems indicating an underestimation of the STG. The 95% limit of agreement was [-13 breaths/minute, 7 breaths/minute]. Head movement (e.g. turning, drinking) showed to limit RR detection by obscuring nostril visibility to the camera. In conclusion, IRT allows for RR detection without equipment on the horse. Horses can be measured continuously without human interference, making it a valuable tool in equine health and welfare monitoring for owners, trainers, and veterinary facilities.

Lay person message: Vital signs, like respiratory rate, are important in monitoring horse health and well-being. Manual on-site monitoring requires time, labour and can be stressful or dangerous. Continuous automatic and non-contact monitoring, however, would provide great benefits. Infrared cameras showed to be able to detect respiratory rate continuously for horses at rest in a stabled environment. This provides opportunities to monitor horses without human interference to ensure their welfare from sports facilities to veterinary practices.

Keywords: Equine, respiration, respiratory rate, non-contact, infrared, thermography

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LT4

A NEW REVERSAL LEARNING TEST FOR HORSES

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Learning difficulties may be linked to sleep disorders in horses, but so far, no practical test suitable for stable conditions has been available. A novel reversal learning test (RLT) was tested on 16 riding school horses. In spatial reversal learning, the horse first learns to make a discrimination, choosing a left or right object and then is supposed to learn to reverse its choice. This tests for example cognitive flexibility. Before the RLT, in the preschool phase it was ensured that all horses were at the same level of learning and got familiar with the objects and positive reinforcement training method. Horses were shaped to touch an object with their muzzles presented individually from both sides and at different distances until the behaviour was fluent. In the preschool all horses learned to follow the object location (i.e. left or right) for reinforcement for median (CL95%) duration of 16.0 (16.8–19.6) min. In the RLT, there were two similar objects presented at the same time and horses could choose the starting side freely. When the horse reached a rate of 7 touches per minute of their choice, the correct location reinforced was reversed until the test was over. The end criteria were that the treats were finished, the horse stopped working or 30 min had elapsed. 15/16 horses were able to reverse more than 3 times and were considered to have learned the concept of reversing. Two days after RLT, the duration of REM-like-sleep (REMLS, resting neck relaxed sternally or laterally) the horses performed was recorded in their stalls from 16 to 08. Data were scored further as lasted either for less or at least 20 min (short or long REMLS). With a log-rank test the possible differences in learning curves tested between short or long REMLS. Overall, 15/16 horses completed the test, with a median (CL95%) number of 6.0 (6.1–7.4) successful turns in 14.0 (12.4–14.6) min. However, the median number of successful turns was at 5 (3.9–6.1) for short REMSL and at 6 (4.3–7.7) for long REMSL ($\chi 2 = 6.4$, $p = 0.01$). To sum up RLT can be performed under stable conditions. Differences in test success may be explained by differences in sleep. More studies are needed to show the connection between sleep and learning in horses. Poor performance because lack of sleep would motivate horse people to consider the horses' environmental conditions and other factors affecting sleep and thus improve the horses' lives.

Lay person message: Impairment of learning may be related to sleep disorders in horses, but a practical experiment to test learning in horses under stable conditions has so far been lacking. The new turn test (RTL) was previously piloted on horses, and it was tested on 16 riding school horses. Horses' stable behaviour was imaged and the amount of nightly REM like sleep scored. It is possible to perform the turn test in stable conditions and the differences in the success of the test could be explained by sleep disorders. If the horse cannot rest enough for one reason or another, it might affect learning and performance of the horse in the long-term.

Keywords: Reversal learning, sleep, horse, target, learning, clicker training

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LT5

INTERPRETATION OF EQUINE AFFECTIVE STATES: AN EXPLORATION OF CONSISTENCY

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Assessing affective state is critical for improving welfare, but consistency in interpretation is uncertain between and within individuals. The hypothesis was, "Students with limited experience in equine behaviour would vary in opinions but be consistent when re-evaluated." A Qualtrics questionnaire containing 6 videos of horses exhibiting various affective states was sent to undergraduates not enrolled in an equine class (UG, n=10). After viewing each video, subjects marked a graphical representation of the circumplex model of valence (V) and arousal (A) with their perception of the affective state. Responses provided coordinates for each subject's response as well as quadrant selected: (positive V, high A) (positive V, low A) (negative V, high A) (negative V, low A). Within one week of survey completion, UG were interviewed for reflection of initial observations. After reviewing videos, students were shown a blank circumplex model and asked to provide verbal descriptors about their current opinion of V and A but were not asked to replot their opinion. Responses underwent inductive coding as part of a thematic analysis process and were compared against the initial VA quadrants. For example, word choices such as "negative", "stressed", and highly aroused would be placed in high A, negative V. The 6 videos viewed are described as follows: 1 (spooked horse during a ride), 2 (horse walking toward person), 3 (horse walking through a pasture), 4 (horse tied to a fence), 5 (horse walking on a lunge line), and 6 (horse rolling in a pasture). Initially, the students showed greater variance in interpretation of A for 5 videos while V only differed in quadrant selection (positive V or negative V) for 3 videos. During the reflection interview, students changed their quadrant selection as determined through verbal descriptors of A 26 times and V 8 times. Overall, students' verbal opinions of A shifted to be more neutral, either from high to neutral, or low to neutral when interviewed. For V, the highest perception change was from positive to neutral. Results showed that interpretation of V generally remained consistent upon re-evaluation, while interpretations of A frequently exhibited variability drifting towards neutrality contrary to our hypothesis. Live interviews may cause individuals to become more uncertain of their opinions and shift toward neutrality. This shift shows the dynamic nature of equine affective state interpretation and raises the question: What factors influence changes in perception, shaping what constitutes a good life for horses?

Lay person message: The aim of this study was to explore how undergraduate students interpret equine emotions and consistency of those opinions. Students were shown 6 videos of horses with various emotional states and asked to mark a graph of the relative positivity or negativity of an emotion and level of intensity. Students were interviewed and shown the same 6 videos and asked for their opinion about the horses' emotions as well as body language of the horse that led them to their answer. Students often changed their opinion during the interview. Interpretation of equine emotions showed shifts toward neutrality during interviews.

Keywords: Affective state, perception, behaviour, consistency, neutrality, horse

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LT6

INTERPRETING AFFECTIVE STATE: CAN WE AGREE?

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Accurately assessing equine affective state is key to optimizing equine welfare and human safety. Identifying misperceptions can better inform educational interventions. Methodologies which provide rapid feedback may be useful in designing effective educational interventions and understanding public perceptions. Utilizing a circumplex model (CM) of valence (V; x-axis) and arousal (A; y-axis) allows individuals to select their interpretation of the animal's emotional state. To validate this methodology interobserver reliability of experts was calculated and compared with students with no training in equine behaviour. An online Qualtrics questionnaire was distributed to equine behaviour experts (EX, n=6), as well as undergraduate students (UG, n=75). To determine interobserver reliability and consensus, EX and UG were provided 6 videos of horses exhibiting various affective states. After viewing each video, subjects marked a point on an image of a circumplex model of valence (V) and arousal (Y) indicating their perception of the affective state. Qualtrics output provided coordinates of the plotted V, A, as well as ordinal data for quadrant selection: (positive V, high A); (positive V, low A); negative V, high A); (negative V, low A). The 6 videos viewed are described as follows: 1 (spooked horse during a ride), 2 (horse walking toward person), 3 (horse walking through a pasture), 4 (horse tied to a fence), 5 (horse walking on a lunge line), and 6 (horse rolling in a pasture). Expert interclass correlation coefficient for the videos was analyzed. The two populations (EX, UG) were compared via centroid analysis in MANOVA of SAS using Wilk's Lambda distribution. Expert and student variances were analyzed using a two-sided t test and Levine's test for the equality of variance. The expert interobserver reliability was poor for coordinate data A (0.148) and V (0.036) and moderate for quadrant agreement (0.492). The centroid analysis indicates that EX differed from UG in perception of V and A ($P<.0001$). Quadrant selection for 3 videos differed between EX and UG ($p<0.05$). There was greater agreement with valence with 3 of 6 videos differing between EX and UG, but mean arousal scores varied in 5 of the 6 videos ($p<0.05$). EX and UG showed little agreement in interpreting equine affective states, particularly in valence and arousal, which are crucial components of emotional state evaluation. This study indicates the need to work towards consensus of understanding equine behaviour to ensure a good life for horses.

Lay person message: Failure to understand a horse's emotional state can pose risks to their well-being and human safety. This study explored a new method for evaluating equine emotions. Experts and students were asked to assess the emotions of horses in videos by marking a graph of the relative positivity or negativity of an emotion and level of intensity. There was little agreement between experts, or experts and students. These findings emphasize the challenges in interpreting equine behaviour and the need for better training. In essence, understanding a horse's feelings is crucial for their welfare and human safety, but it is complex.

Keywords: Affective state, behaviour, interpretation, perception, welfare, horse

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DAY 2 RELATED

At the end of Day 1 a briefing for field day and field experiences – How do we assess a Good Life?

On Day 3 - debrief

DAY 3: APPLICATION TO PROVIDE A GOOD LIFE FOR HORSES sponsored by Via Nova

THEME 4: THE IMPACT OF LIFE EXPERIENCES sponsored by New Zealand Warmblood Association

PL4

SETTING UP HORSES FOR A GOOD LIFE

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Setting young horses up for a good life in their interactions with humans requires consideration of their basic needs as well as their future use. This plenary will present main findings from the current research and pinpoint knowledge gaps in relation to three key developmental periods: (1) The pre- and early post-natal period, (2) the period around weaning and (3) adolescence. The presentation will focus on how experiences in these early-life periods can affect fearfulness, learning and trainability, reactions to humans and social behaviour in the adult horse.

For young mammals, the mother is one of the most salient aspects of the environment. Research on other mammalian species has documented both pre- and early postnatal maternal effects on behavioural development and stress sensitivity of the offspring. For example, stress in certain periods during pregnancy can increase stress sensitivity in the offspring, even in adulthood. Further, the level and quality of maternal care during early post-natal life can have lasting effects on learning performance, social behaviour and stress reactions in the adult offspring. Also in horses, the mare plays a crucial role for the behavioural development of the foal. The knowledge on prenatal stress effects in horses is still rudimentary due to a lack of studies, although the topic is highly relevant considering management practices for pregnant mares, and the use of recipient mares for embryonic transfer. More is known about post-natal effects in horses. In the early post-natal period, the foal learns about the environment from observing the mare's reactions. Research has shown that gentle handling (brushing and hand feeding) of mares for 15 min on days 1-5 post-partum caused their foals to react more calmly towards humans and human handling compared to control foals of unhandled mares. Similar effects of maternal handling were found when carried out with 6 months old foals - however the effects were less pronounced. In combination, these studies suggest that horses are particularly sensitive to maternal transmission of behaviour early in life. It has also been shown that mares transfer habituation to frightening objects to their foals: Short (10 min) weekly demonstration sessions by habituated mothers led to significantly reduced fearfulness in foals when they were later exposed to novel objects on their own, compared to control foals. Since fear reactions are a main cause of human-horse accidents there is a large potential for reducing the frequency of accidents through systematic maternal transmission of habituation. Other studies have shown that fearfulness can be identified at an early age in horses and determined a positive association between curiosity and learning performance in young horses. This means that by initiating appropriate habituation training (including via the mare) at an early age, it will likely be possible to both increase safety and benefit training outcomes.

The physical and social environment is generally of key importance for the developing horse, both before and after weaning. All horses, and in particularly foals and young horses, need free movement, an appropriate roughage-based diet and social contact to other horses to ensure their normal physical and behavioural development. Particularly play behaviour is important for normal development: foals and young horses are strongly motivated to play, and in the wild, foals that play more have a greater survival chance. Further, young horses are easier for humans to handle if their social needs are met, providing an additional benefit to allowing horses to express their naturally motivated social behaviour.

Weaning is a major event for the young horse and should preferably take place at or after the natural weaning age at around 9-10 months of age. Under domestic conditions, weaning often takes place earlier, typically at 4-7 months of age. Weaning has been associated with mental, physical and nutritional stressors that are of welfare concern. For example, abrupt weaning is related to an increased risk of development of stereotypies such as crib-biting. Thus, there is a need to understand the potential long-term impact of weaning, and whether stressors associated with early weaning have detrimental effects on the adult horse. The fewest stress responses appear to occur when foals are introduced to a fat- and fibre-rich diet prior to weaning, weaned gradually and allowed to have social contact with other foals and/or older horses at weaning.

After weaning, young horses should preferably be kept in mixed age groups, or at least with a few older horses present in the group as this was found to be beneficial for their social behaviour in terms of lowered agonistic interactions and more affiliative interactions. Some studies suggested that weaning and adolescence provides a window of opportunity for behavioural modification; however, in horses there appears to be no solid evidence for the existence of periods that are particularly sensitive for facilitation of a good horse-human bond. Rather, the affiliative qualities of human-horse interactions may be more important than at which age the interactions occur. As described above, establishing a positive human-mare relationship may be an important key to durably enhance the manageability of foals. Of equal importance is establishing clear and consistent interactions with the foals themselves and as far as training is concerned, to use techniques that fully align with learning theory.

The emerging research field in relation to positive mental states in animals will help further illuminate how a good life for the young horse can lead to stress-resilience, reduced fearfulness, a good human-animal bond, and improved performance, which paves the way for a good adult life.

Lay person message: Setting the young horse up for a good life requires consideration of their basic needs in terms of social contact to other horses, plenty of space to express free locomotion and play behaviour, and an appropriate roughage-based diet. It also requires habituation to humans, handling and to various potentially frightening situations, preferably from an early age, and ideally through social transmission of behaviour from the mare. Preparation of the young horse for its adult life can help ensure a good life and improve safety in the horse-human relationship.

Keywords: Early-life experiences, maternal transmission, safety, welfare, Good Life.

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RP12

FAMILIARISATION, POSITIVE ASSOCIATIONS, AND ITS EFFECTS ON FOALS RESPONSE TO A FEAR TEST

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Horses are frequently subjected to challenging situations which could negatively influence their welfare and performance. This research investigated whether prior positive experiences in an unknown environment could modulate responses to a fear test. Twenty Brazilian sports horses, 10 males and 10 females, between 2 and 3 years of age, were randomly allocated in two groups. The Familiarization group was taken individually to an unfamiliar paddock where they remained for 10 minutes, with access to forage and concentrated food as a means to induce a positive association with the new environment. A familiar adult horse was brought to the adjacent paddock to mitigate social isolation stress on both days. The following day, all horses were brought in a randomized order to the same paddock and allowed 1 minute to briefly adapt before undergoing a fear test. The fear test was adapted from the AWIN protocol (2015) using a green plastic bottle of 1.5L, partially filled with rocks and positioned on the fence, at a height of 1.6 metres and held at a distance of 4 metres using a rope. If the horse investigated the bottle, or after a period of five minutes, the rope was pulled and the bottle was dropped to the ground abruptly, emitting a loud noise. The test was terminated when the horse approached the fallen bottle or after five minutes. All procedures were filmed and behaviours such as position in the paddock, vocalization, near the companion horse and others were analysed through Boris software. Data were analysed using a paired T-test in RStudio. The Familiarized group exhibited significantly lower latency than the Control group in investigating the bottle after being dropped ($p=0.015$), being the mean for the familiarized group 53 seconds with a standard error of the mean of 53±19.2. For the control group, the mean was 168.8 seconds, with a standard error of the mean of 168.8±38.8. For the familiarized group, the latency to explore the bottle after being dropped was significantly lower when compared to the time since the bottle was presented ($p = 0.008$). The latency results suggest that horses from the familiarized group were able to deal better with the challenge. It appears that they were more comfortable to explore the environment and had a milder response to the fear test. Developing innovative protocols focused on providing positive experiences might be effective in helping horses cope with challenges in new situations, e.g., hospital visits, competitions, etc. and should be further studied to provide a good life for horses.

Lay person message: We investigated whether positive experiences in a new environment could prepare horses to deal with challenging situations. We provided one group of horses with positive experiences before facing a challenge and they seemed to cope better than the group that did not have any previous experience. This could suggest new protocols to be used in competitions, medical procedures, and daily handling, aiming to provide a good life for horses, reducing stress.

Keywords: Familiarization, positive experience, fear test, early life experience, welfare

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RP13

THE INFLUENCE OF INSERT PERCEIVED EQUINE PERSONALITY ON POLICE HORSE SELECTION

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In active police work, horses are primarily used to monitor urban environments and perform specialized responsibilities such as riot and crowd control. The process of selecting horses for police work requires consideration of not just physical but also emotional qualities of the horse that reflect personality traits and contribute to a horse's ability to learn, work, and interact with humans. One model of personality traits previously validated for horses includes four personality dimensions: extroversion, neuroticism, gregariousness, and agreeableness. The purpose of this study was to determine what personality traits were deemed important for mounted police horses, if there were differences according to use and if current mounts actually demonstrated these traits. A 16-item online survey received 129 responses from mounted police officers in nine different countries detailing information about their horses' physical traits (height, breed, colour), perceived personality traits and uses of current mounts, and querying riders on what traits they considered important or deal breakers for potential police horses. Respondents selected words from a list of 32 personality traits representing positive and negative aspects of the four main personality dimensions. Descriptive statistics reported frequencies of personality traits and chi-squared analysis with Fishers Exact Test (FET) determined differences in frequencies of important and deal breaker traits to current mounts. Results showed that current police horses were described mostly with terms relating to positive agreeableness (e.g. Willing 62%, Trusting 56%) and negative neuroticism (e.g. Reliable 62%, Calm 62%) which matched the most selected personality traits respondents considered important for police horses (FET two-tailed $p>0.05$). Most current mounts (95%) did not present with any of the top five deal breaker traits (Aggressive, Fearful, Uncooperative, Nervous, and Unreliable; FET two-tailed all $p>0.05$). The deal breaker trait Fearful was considered more undesirable in horses used for Neighbourhood Patrol and Park or Wilderness Patrol than for Crowd Control or Search and Rescue (FET two-tailed $p<0.05$). Draft crosses were reported as less Approachable than other breeds (FET two-tailed $p<0.05$) and geldings were reported as more Bold than mares (FET two-tailed $p<0.05$). These findings provide a greater understanding of what mounted police officers value in their mounts and will be beneficial for the development of more accurate police horse testing protocols. Selection of horses suitable for their job will ensure a better life for those horses as well as improve horse and rider safety.

Lay person message: Specific horse personality traits like Calm, Willing, Reliable and Trusting are valued by mounted police officers and are generally reflected in their current mounts. Undesirable personality traits may differ depending on the specific use of the police mount. Identifying specific traits that are desired or unwanted will allow police horse testing protocols to be developed for suitability and selection for police work ensuring the welfare and safety of horses, mounted officers and the community.

Keywords: Agreeableness, neuroticism, trusting, calm, willing, reliable

Return to programme

RP14

OWNER-OBSERVED BEHAVIOURAL CHARACTERISTICS OF OFF-THE-TRACK THOROUGHBREDS (OTTTBS) IN EQUESTRIAN SECOND CAREERS

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The rich history of off-the-track Thoroughbreds (OTTTBs) in equestrian sport has generated a valuable body of anecdotal knowledge of their behavioural characteristics; however, evidence-based resources are relatively lacking. It is important to gain objective understanding of OTTTB behaviour, to responsibly prepare them for the transition from racing to equestrian careers. The current study used owner-reported observations (n = 1663), extracted from the Equine Behaviour Assessment and Research Questionnaire (E-BARQ) database, to compare behaviours of OTTTBs with those of other horse breeds. Boldness, compliance, rideability, trainability and responsiveness to acceleration and deceleration signals were evaluated in the context of 27 E-BARQ items determined by exploratory factor analysis. OTTTBs in this study demonstrated significantly higher boldness ($t=3.793$; $p=0.0002$), and lower compliance and responsiveness to deceleration cues ($t=3.448$ $p<0.0006$), than control horses. Trainability, rideability and responsiveness to acceleration cues didn't differ significantly between OTTTBs and the control group, although these behavioural categories were limited by low retention of questionnaire items, and as such may be considered inconclusive. The current finding of greater boldness in OTTTBs compared to other horses challenges previous studies and calls for further research to differentiate between the relative influences of inherent breed temperament and acquired life experience. The E-BARQ collects detailed information regarding training and management practices that could facilitate future analysis of the effects of these variables on behaviour. With increased understanding of how boldness relates to racing experiences, these might be more purposefully optimised to benefit the horse in its equestrian second career. The areas in which OTTTBs compared unfavourably to other horse breeds represent aspects of behaviour that can be addressed proactively, to a certain extent, with foundation training. The importance of thorough foundation training for OTTTBs is heightened by their lower value than other horse breeds on the equestrian market, and consequent susceptibility to lower standards of equitation. While it is not possible to control demand or regulate training practices in the equestrian sector, OTTTBs are uniquely advantaged in that they spend the first phase of their life in the care of licensed professionals. This means that there is opportunity, as well as obligation, to ensure OTTTBs are provided with forward-thinking foundation training that will position them for a lifetime of good welfare. There is a compelling need for more OTTTB-focused behaviour research, to help inform and strengthen the case for earlier integration of science-based training principles.

Lay person message: Equestrians offer a vital avenue of rehoming for Thoroughbred horses that retire from the racing industry. An objective understanding of off-the-track Thoroughbred behaviour is needed to help them transition from racing to equestrian careers. This study looked at behaviour in off-the-track Thoroughbreds compared to other horse breeds, using the Equine Behaviour Assessment and Research Questionnaire (E-BARQ) database. Off-the-track Thoroughbreds showed greater boldness, lower compliance, and less responsiveness to deceleration cues than other horses. These findings provide direction for future research into influential factors and improvement opportunities in the training and management of Thoroughbreds, on and off the track.

Keywords: Equine behaviour, racing welfare, racehorse retraining, racehorse rehoming, retired racehorses, off-the-track

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PL5

SAFE, EFFECTIVE, AND ETHICAL HORSE-HUMAN INTERACTION

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The bond between horses and humans dates back thousands of years, evolving from utilitarian purposes to more nuanced roles in modern society. Initially domesticated for labour and transportation, horses have transitioned into companions and athletes, showcasing the versatility and adaptability of this relationship. The essence of horse-human interaction lies not only in the physical engagement but also in the profound psychological and emotional connections that are formed.

The foundation of a safe and ethical relationship between horses and humans is built on mutual respect, understanding, and communication. Horses are sensitive animals capable of experiencing a range of emotions, and their responses to human interaction can vary based on their past experiences, training, and the current context of interaction. The development and maintenance of a positive human-horse relationship are essential in not only minimizing fearfulness, stress, and potential accidents, but also increasing the possibilities for horses to have positive experiences in modern roles.

Central to safe and effective interaction with horses is a profound understanding of their psychology and behaviour. Being prey animals, horses display unique behavioural patterns and responses to stimuli that are fundamentally different from those of predators or domestic pets. This distinction is crucial for human handlers to grasp and respect. At the heart of equine communication lies an intricate system of body language, vocalizations, and behaviour. Horses communicate their emotions and intentions through subtle and sometimes overt gestures. Their body language includes ear positioning, tail movement, and overall body posture, each conveying distinct messages. Vocalizations such as neighing, snorting, and whinnying also play a key role in their interaction, not just with other horses but with humans as well. Understanding these signals is vital for handlers to ensure a harmonious and safe interaction. Recognizing behavioural indicators of both negative and positive affective states in horses is imperative. Negative states such as fear, anxiety, or discomfort can manifest in ways like shying away, rearing, or even aggressive responses like biting or kicking. Positive states, conversely, are often shown through relaxed posture, gentle nuzzling, and calm, steady breathing. Yet, most humans are, when interacting with horses, focused on behavioural indicators of negative states. It's crucial for anyone involved with horses, whether a professional trainer, a veterinarian, or a recreational rider, to interpret these signs accurately. Failure to understand and respond appropriately to these cues can lead to situations that not only compromise human safety but also negatively impact the welfare and psychological well-being of the horse.

Also the behaviour of humans in interactions plays a significant role in the dynamics of the relationship. Horses have the remarkable ability to individually respond to different human behaviours, even in identical environmental settings. This individual responsiveness highlights the need for consistent and empathetic handling. For example, a horse may react calmly and cooperatively with a handler who approaches gently and speaks softly but may become tense or skittish with a handler who is abrupt or loud. Such nuances in behaviour underscore the importance of understanding equine psychology and tailoring human actions to suit each horse's unique temperament and experiences. Handlers who exhibit patience, calmness, and understanding are often more successful in building trust and cooperation with horses. Patience is key, as rushing or showing frustration can easily unsettle a horse. Calmness, both in demeanour and action, helps in creating a reassuring environment for the horse, making them feel safe and less anxious. Understanding, particularly of equine body language and

emotional states, allows handlers to adjust their approach based on the horse's feedback, fostering a deeper connection.

Advances in technology and research have significantly impacted how humans interact with horses. For example, the technological advancements have enabled the non-invasive monitoring of horses' heart rate variability, providing insights into their emotional states during interactions with humans. This technology has shown that horses experience reduced stress and feel more relaxed when interacting with familiar handlers, highlighting the importance of positive long-term relationships. Research into horse cognition and learning has advanced, providing valuable insights into how horses perceive and interact with humans. This knowledge aids in developing more effective training and handling techniques that are aligned with the natural behaviour and cognition of horses.

Horse-human interactions can have significant effects on the welfare of horses, with both positive and negative outcomes depending on the nature of the interaction. Horses interacting with familiar handlers have shown reduced stress responses. When horses engage in physical contact, like grooming, with known handlers, there is a decrease in stress, as indicated by lower heart rate variability. This familiarity fosters a relaxed and positive environment for the horse. Utilizing positive reinforcement in training enhances learning and creates positive memories associated with human interaction. This approach leads to increased interest and contact with humans, even months after training, promoting a more positive perception of humans by the horse. On the other hand, training methods utilizing punishment can lead to increased emotional stress in horses. Such methods are associated with elevated heart rates and more avoidance behaviours, resulting in a less positive perception of humans. Also, misinterpretation of horse behaviour by humans, particularly regarding stress, fear, and reactivity, can result in interactions that do not account for the horse's emotional state. This lack of understanding can exacerbate stress and fear in horses, negatively affecting their welfare.

In conclusion, safe, effective, and ethical horse-human interaction hinges on a comprehensive understanding of equine behaviour and psychology, combined with humane and respectful handling practices. Prioritizing the welfare and emotional well-being of horses not only enhances safety but also strengthens the bond between horses and humans, leading to a good life for horses. As research continues to evolve, so too should the practices and approaches to horse-human interaction, always with the aim of ensuring the mutual benefit and wellbeing of both parties involved.

Keywords: Horse-human interactions, equine behaviour, equine welfare, affective state, safety, ethical

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RP15

IDENTIFYING RISK FACTORS FOR CONFLICT BEHAVIOURS IN CANADIAN RIDING LESSON HORSES

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Riding lesson horses are suggested to have poorer welfare illustrated by higher levels of abnormal behaviour, physical injuries, health issues, aggression towards humans and "depressed-like" posture compared to pleasure horses. Incidences of injury and death of lesson horses vary greatly among barns, suggesting that management plays a role in their health and longevity. To understand current lesson horse management practices, an online survey was distributed to the owners, managers, and coaches of Canadian riding lesson facilities to collect demographic information about the respondents, facilities, lesson horse populations, observed behaviours and management strategies. Responses (n=153 facilities representing 1501 lesson horses) were analyzed using descriptive statistics and two-tailed Fisher's exact tests to examine associations between variables. The average number of horses per lesson facility was 10 (±8.3). Facilities with fewer than six lesson horses reported lower proportions of horses who were reactive when tacking up (p=0.0002), bit their handlers (p=0.0005) and pinned their ears under saddle (p=0.037) compared to facilities with six or more horses. Lesson horses worked an average of 2h/d (range 0.25-8h). Longer maximum working hours per day were associated with higher proportions of horses who bucked under saddle (p=0.03). Facilities with larger herds (13+ horses) were more likely to have longer maximum working hours per horse (over 3h/d) compared to smaller herds (less than 2h/d; p=0.006). Restrictive equipment was associated with conflict behaviours both on the ground and under saddle. Facilities who reported greater use of side reins indicated increased frequencies of reactivity when tacking up (p=0.02), and pawing (p=0.003), kicking (p=0.04) and pinning ears (p=0.009) while under saddle. Greater use of flash nosebands was associated with increased frequency (p=0.04) and higher proportions (p=0.008) of horses who buck under saddle. Conversely, facilities with greater proportions of horses who did not wear nosebands reported fewer horses who bucked under saddle (p=0.005). These results identify equipment use, daily workload and herd size as risk factors for conflict behaviours in lesson horse populations. In particular, lesson facilities with smaller herds may be able to better attend to the individual needs of their horses, potentially mitigating levels of conflict behaviour. This insight into the effects of management strategies and specific stressors for lesson horses can inform future strategies for protecting lesson horse welfare and longevity.

Lay person message:
Riding lesson horses are thought to have poorer welfare than other types of horses. A survey was distributed to Canadian riding lesson facilities to investigate how lesson horses are currently managed and how these factors impact conflict behaviours. Lesson facilities with smaller herds reported fewer conflict behaviours, suggesting these facilities are able to dedicate more focus and resources to their horse's individual needs. Restrictive tack and long working hours may be risk factors for increased conflict behaviours, which can indicate a negative state of welfare and threaten rider safety. Management can mitigate these risks and promote lesson horse welfare.

Keywords: Equine welfare, riding lessons, lesson horses, conflict behaviours, management practices, tack use

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RP16

THE EFFECT OF TOUCH ON HORSES DURING HUMAN-HORSE INTERACTIONS

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Touch interaction between humans and horses is a feature common to almost all equine-assisted services (EAS) although less is known about how horses perceive this tactile stimulation during human-horse interactions. The current study aimed to assess the effect of three types of touching (patting, stroking, scratching) on three anatomical body locations (neck, body, hindquarter) of therapy horses (n=10) under two different treatments (consensual and non-consensual) on horse behaviour and heart rate (HR). Human participants (n=25 experienced and n=24 inexperienced with horses) each interacted individually with four horses in both treatment conditions while in a familiar round pen. During the non-consensual treatment, the horse was tethered for the duration of the session (4.5min) and the participant was instructed to touch each body location with each type of touch, switching every 30s. During the consensual treatment, the horse was loose in the pen and the participant, standing in the centre, was instructed to touch the horse only if the horse came within arm's reach. The control session consisted of the horse free in the round pen with no human present. Horse HR was collected and horse stress-related behaviours were coded retrospectively from video recordings. A Generalized Linear Mixed Model with repeated measures examined the effect of treatment, touch type and location on horse behaviours and HR. Oral behaviours (1.29±0.12), restlessness (5.67±0.24) and tail swishing (4.77±0.09) were higher during non-consensual treatments than consensual treatments (0.75±0.06, 4.29±0.24 and 4.44±0.09 behaviours/min respectively) and control sessions (0.15±0.03, 1.29±0.15 and 1.59±0.06 behaviours/min respectively; $p<0.0001$ for all). Touch type and location respectively had no influence on oral behaviours ($F_{(2,3347)}=0.40$, $p=0.67$; $F_{(2,3347)}=1.00$, $p=0.37$), restlessness ($F_{(2,1882)}=0.90$, $p=0.41$; $F_{(2,1881)}=0.16$, $p=0.85$) and tail swishing ($F_{(2,3109)}=0.88$, $p=0.42$; $F_{(2,3109)}=1.25$, $p=0.29$). Horse HR was higher during consensual (41.27±1.19bpm) compared to non-consensual (40.38±1.17bpm) treatment although neither treatment differed from the control (43.10±2.36bpm; $F_{(2,3554)}=11.49$, $p=0.0007$). Horse HR was not influenced by touch type ($F_{(2,3544)}=0.08$, $p=0.92$), location ($F_{(2,3544)}=0.05$, $p=0.95$) or participant experience ($F_{(1,35.96)}=0.04$, $p=0.85$). These results demonstrate subtle behavioural and HR differences in horses during consensual and non-consensual touch interactions highlighting the importance for handlers to detect and mitigate the incidence of stress-related behaviours in horses during EAS. Ultimately, the findings can be reflected in the guidelines of therapy horse organizations to minimize human risk of injury and ensure a good life for horses.

Lay person message: Touch is a key part of most human-horse interactions. How horses responded to being touched by humans in various ways and locations was explored when the horse was tethered (and unable to move away) or loose. Results showed that the type of touch (patting, scratching, stroking) and location (neck, body, hindquarter) did not affect horse behaviours or heart rate, but treatment did. Horses who were tethered displayed more oral behaviours, tail swishing and restlessness, indicating they did not enjoy this interaction as much compared to when they were loose and able to choose whether to interact or not.

Keywords: Equine-Assisted Services, stress, oral behaviours, tail swishing, restlessness, heart rate

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RP17

DIFFERENCES IN JOCKEY POSITION ALTER MUSCLE RECRUITMENT AND HORSE-RIDER INTERACTION

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Jockeys play a crucial role in minimising injury risk to horses during a race, in addition to influencing their ridden experience and ultimate success. Despite this pivotal role, there are limited data describing the physiological challenges of race-riding, and how jockey muscular fatigue during a race may influence the horse. This study aimed to quantify the sport-specific demands of jockeys in training and race-riding. Analysis of 14-years racing data for 786 jockeys revealed that jockeys with higher competitive workloads performed better than those with lower workloads, implying the need for sport specific exercise to be "match fit". Ride specific physiological demands of professional jockeys (n=4) and apprentices (n=12) were determined by opportunistically instrumenting jockeys with heart rate (HR) monitors, global positioning system, accelerometers (body displacement) and electromyographic clothing during a typical day at track-work (n=48), trials (n=52), and races (n=16). The physiological demands of riding increased from low during track-work (~65%HR_{max}), to moderate at trials (~81%HR_{max}), and near-maximal during race-riding (~94%HR_{max}, $p<0.001$). Vertical head oscillation of jockeys during track-work was higher (0.12±0.01m) compared to trial (0.07±0.03m) and race-riding (0.05±0.02m, $p<0.05$), indicating greater control over synchronous muscle activity in race-riding jockeys. Race-riding jockeys had greater hamstring activation (21±15% of all muscle activity) than jockeys riding track-work (14±5%) or trials (7±4%, $p<0.05$), indicating they adopted a lower crouched posture, with their centre of mass shifted anteriorly. This change in posture and shift in recruitment from upper body musculature in trackwork/trials (3-point position with hands resting on the neck), to recruitment of the core and hamstrings in races (with independent hands), was associated with an increase in relative workload (TRIMP=time*HR zone). TRIMP scores for race-riding jockeys were 4.7±1.2/min vs 3.8±1.5/min at trials and 2.1±1/min for trackwork (TRIMPS/min, $p<0.001$). A survey of professional jockeys (n=63, 40% of NZ jockey population) indicated that the main form of exercise for jockeys was riding trackwork and races, indicating that apprentice jockeys, with lower frequencies of race-day rides, do not have sufficient specificity in training to ensure development of adequate fitness for race-day riding. By improving jockey conditioning, it is hypothesised that the chance of race-riding errors can be reduced and the opportunity for jockeys to positively influence horses in race situations will increase. In the long term, this should enhance the jockey's ability to safely and optimally prepare for race riding, reducing the incidence of race-day accidents and enhancing both horse and jockey welfare.

Lay person message: Jockeys have a primary role in horse welfare during racing. Instrumentation of jockeys during trackwork, trials, and races identified the greater physiological load and altered muscle activities (greater hamstring and core activation, upper body independence and centre of mass shifted anteriorly), with lower vertical head oscillation of race-riding jockeys. As riding in trackwork and trials is the primary exercise for jockeys, apprentice jockeys with fewer race-day rides lack the race-specific skills and fitness required for successful and balanced race-riding. By improving jockey conditioning, it is proposed to reduce race-riding errors, promoting overall welfare for both horse and jockey.

Keywords: Rider, fitness, conditioning, horse welfare, horse-rider interaction

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RP18

EXPLORING ATTITUDES OF VETERINARY HOSPITAL STAFF TOWARDS PAIN ASSESSMENT IN HORSES: A QUALITATIVE STUDY

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In recent decades, many equine pain assessment tools and methods have been created. However, it is unclear how frequently these tools are utilised in equine practice, despite the surge of research in this area. This is particularly noteworthy as the use of pain assessment tools in small animal practice is increasing. Understanding how equine veterinary professionals assess pain clinically is critical, as it may influence the future development of and training in pain management. It is particularly important to identify barriers encountered which prevent effective pain assessment and may negatively impact horse welfare. Moreover, horses that are painful pose increased risk to staff safety. This qualitative study sought to investigate the attitudes of equine veterinary professionals towards pain assessment and the barriers to their use in the clinical setting. Semi-structured interviews were conducted with veterinary professionals (n=9 participants) working at a UK equine hospital. Data were pseudo-anonymised, transcribed, and thematic analysis performed. The results of the analysis found published pain assessment tools were infrequently used and respondents reported that they *"could do better".* Participants consistently reported that familiarity with a horse and their behaviour was central to the successful assessment of pain *"the ones that see it day in day out, are the most important to listen to"*. Furthermore, participants highlighted that despite owners varied ability to recognise pain, veterinary professionals *"underestimate the owner's opinion".* Pain assessment training, role responsibilities and external and internal stressors affecting equine behaviour were reported as limitations in participants' ability and confidence to recognise pain-related behaviours. Staff who had participated in pain assessment research or training reported they could recognise more subtle pain related behaviours *"since starting to look at behavioural scales, I think I'm now better than I used to be recognising subtle behavioural signs".* Some participants reported using a simple 0-4 pain scale in the hospital but stated that, although simple, this scale *"is not ideal. It's very vague"* and *"too broad".* It was reported that *"students feel a bit overwhelmed about composite scales".* Despite this, only one participant mentioned time as a barrier to conducting pain assessments within the hospital. Despite lack of use, many participants expressed a desire for the application of these *"under utilised"* tools. This study provides an insight into the practical barriers faced within equine clinical practice and highlights an eagerness from staff to improve pain recognition to provide better care for patients and create a safer working environment.

Lay person message: Being able to recognise horse pain is important. This study investigated the thoughts of veterinary hospital staff who work with horses about how they assess for pain. Results showed underuse of existing methods and tools, which assess horse pain, and participants reported they want to understand how to assess pain better. Results demonstrate it's important to pay attention to each horse's behaviour and listen to what the people who take care of them have to say. Understanding what contributes to the accurate assessment of pain could help provide a good life for horses and reduce the injury risk to people.

Keywords: Pain perceptions**,** pain assessment, equine behaviour**,** welfare, veterinary hospital

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PAS7

AN INVESTIGATION INTO THE EXERCISE HABITS AND PERCEPTIONS OF EQUESTRIAN RIDERS

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Research has demonstrated that conflict behaviours in horses are reduced as the performance determinants of the rider improve. Hence a good life for the horse can be enhanced by enabling the rider to better coordinate with the horse's locomotion. Understanding equestrian exercise habits is the foundational step in contributing to the development of discipline-specific athlete programs to optimise the rider's skill for performance, safety, and horse welfare. The purpose was to investigate: 1) the unmounted (non-riding) exercise habits of equestrians; and 2) the perceptions equestrians have about themselves as athletes. A 25-question anonymous online survey hosted on Qualtrics was distributed via social media and email. The survey was open to Australian adults (18+ years of age) who participated in dressage, show jumping, or eventing with no restriction on rider experience or competitive level. Responses were exported from Qualtrics for further analysis, which included descriptive statistics, and Chi-square tests to examine differences between disciplines. There were 454 complete responses: 332 (70.7%) dressage, 80 (17.6%) eventing, and 52 (11.5%) showjumping riders. Overall, 78.4% participated in unmounted exercise (at least once per week); however, of those who exercise 58.1% engaged in exercise specifically for riding purposes. When asked what exercises they specifically performed for riding purposes, the most popular exercises respondents identified were yoga/stretching (n = 92, 44.4%) followed by Pilates (n = 67, 32.4%), resistance training (n = 37, 17.9%), bodyweight exercises (n = 36, 17.4%), and walking (n = 34, 16.4%). Chi-square analyses revealed no significant differences between the proportion of riders in the disciplines who engage in exercise (79.8% dressage riders; 78.8% eventing; 69.2% showjumping; (p=0.23)); however, there were significant differences among disciplines in the proportion who engage in rider-specific exercise (62.3% dressage riders; 47.6% eventing; 47.2% showjumping; (p-0.04)). Furthermore, 70.3% of riders agree that they consider themselves athletes, with 96.9% agree that their fitness impacts their riding, but 66.5% consider themselves physically fit. There were no differences in perceptions regarding athlete identity or fitness among disciplines (p>0.05). These findings demonstrate that while most equestrians do exercise, few engage in exercise for riding purposes and the exercises undertaken may not provide sufficient physiological adaptations for discipline-specific performance. Furthermore, equestrian athlete identity is incongruent with the reported sport-specific exercises for equestrian performance. Building the foundation of equestrian performance is a crucial step to augment a good life for the horse through optimising rider skill.

Lay person message: A survey of adult Australian equestrians investigated exercise habits and self-perceptions of fitness among dressage, eventing, and jumping riders. Results from the 454 respondents found that 78% exercised regularly, but 58% engaged in exercise specifically tailored for riding. The most popular rider-specific exercises were yoga and Pilates. While most riders considered themselves athletes and believed their fitness affected their riding, 66.5% thought they were physically fit. These findings suggest that many equestrians exercise but not always in ways that are designed to directly benefit the welfare of the horse, highlighting a need for better alignment between equestrian fitness and performance.

Keywords: Horse riding, sport, dressage, show jumping, eventing

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PAS8

BUILDING A PROFILE OF RIDERS IN RIDING SCHOOLS IN THE UK

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Riding schools are pivotal role in introducing individuals to the equine industry, providing first experiences of horse handling, riding, and influencing future horse-human interactions. To safeguard the welfare of riding school horses and ponies, it is essential for novice riders' safety that riding school staff ensure they are suitably mounted; this is equally important to safeguard the health and welfare of riding school horses and ponies. Despite this limited research has examined human/horse demographics across riding school populations; this retrospective cohort study profiled characteristics recorded for riders across UK-based riding schools from 2019 to 2023 (n=308,698). Key attributes recorded included age, self-reported height, weight and geographical region; height (m) and weight (kg) were divided to estimate rider body mass index (BMI). Descriptive analysis recorded mean± standard deviation for the variables recorded. Chi-square analyses identified if differences in frequency occurred by region (significance: $p<0.05$). The mean age of riders across riding schools was 21±9.2 years; riders had a mean height of 1.46±0.94m, mean weight of 47.8±52.3kg and a mean BMI of 21.0±23.3. For their age range, 38.2% of riders were classified as underweight (BMI:<18.5), 41.5% were healthy (BMI:18.5-24.9), 13.8% were overweight (BMI:25-29.9) and 7.5% were obese (BMI:>30). Regional differences for age, height, weight, and BMI were identified ($p<0.05$) potentially reflecting socio-economic characteristics within these. Rider, horse, workload/type, and environmental factors should be considered when determining if combinations are suitably mounted. Horse-rider weight ratio recommendations vary between 10%, 15% and 20% of horse weight; this translates to riders of 50kg, 75kg and 100kg, respectively, for a 500kg horse. The self-reported average weight of the majority of riding school riders aligns to these guidelines. Limitations include the lack of recorded horse demographic information matched to riders, the absence of rider sex being recorded and that riders may not accurately self-report their height and weight; it is recommended that these data and onsite rider height and weight measurements are implemented to be enable accurate assessment of rider suitably for riding school horses/ponies to safeguard equine welfare. An increased understanding of rider and horse demographics is crucial for developing targeted strategies for horse and rider wellbeing, training programs, and resource allocation.

Lay person message: Riding schools often provide peoples first introduction to riding. The results provide a preliminary overview of the characteristics of riders in UK riding schools; self-reported results suggest most riders have a healthy BMI and appear to be a suitable weight for a 500kg horse/pony. Generation of accurate rider demographic profiles by measuring rider height and weight could be used to guide horse-rider matching to safeguard riding school horse welfare.

Keywords: Riding schools, rider weight, horse-rider relationship, suitably mounted, equine welfare, Social Licence to Operate

Return to programme

PAS9

A GOOD LIFE FOR HORSES BY DESIGN: A REVIEW OF THE EVIDENCE AND PRACTICE OF EQUINE ENVIRONMENT DESIGN AND CONSTRUCTION

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Although equine infrastructure has progressed in terms of accommodating health aspects such as ventilation and daylight; horse facility design remains fundamentally driven by human-based objectives, largely overlooking the impact on horse's mental wellbeing. Predominantly anthropocentric, horse facility design is shackled to long-established traditions and antiquated methods of design, construction and use. The "horses-plus-people" design challenge can be difficult to navigate; however, with a thoughtful and innovative architectural approach, it's possible to satisfy the needs of horses and humans. Today, there's widespread agreement that welfare includes physical and mental states, and satisfying natural behavioural drives is paramount to ensuring a good life for horses. Nevertheless, horse keeping practices rarely consider the behavioural and cognitive characteristics of equids. This is despite extensive research indicating physical and mental development can be supported by environments that accommodate equine-specific characteristics, such as how horses sleep, learn, socialise, move, adapt, and digest. Much is known about the environmental conditions that promote good physiological, anatomical, ethological, cognitive function, and increase dysfunction risks. Education and compliance are challenges to the uptake of change however, for designers these are compounded because designing better facilities involves two established traditions: construction and horse management. Even so, current zoo habitat design practice has left the human-derived enclosure behind. So, while a shift in horse facility design may seem unconventional, potentially controversial and mitigate significant barriers, the threats to the social licence to operate are pressuring all equine sectors to demonstrate practices allowing horses to live a good life. A review of the extant scientific literature that has advanced our understanding of the welfare consequences resulting from conditions imposed upon horses underscores the need for change. Implementing current knowledge in a design context is crucial and supports the premise that any other approach will hinder progress towards ensuring a good life for horses. It highlights architectural aspects such as scale, layout/arrangement, material specification and practicality must be reconsidered to prioritise equine-specific needs. It shows that to advance the quality of life of horses exposed to constructed settings, we must think beyond physical function to consider their holistic experience. The Five Domains Model for welfare assessment provides a valuable framework for the equine experience and lays the groundwork for improving traditional facility models. It is not about ignoring past infrastructure practices but filtering the appropriate historical references and enhancing them by applying an equine-centric lens. This study proposes a holistic design approach that, like the science underpinning it, continues to evolve. It should liberate individuals from traditional, limiting design constructs and aim to authentically progress a good life for horses.

Lay person message: Horse facility design has traditionally prioritised the needs of the people accommodating their horses and their desire to keep them safely enclosed. However, horse welfare can be significantly compromised when the built environment restricts natural behavioural and social needs. The Five Domains Model for welfare assessment and monitoring provides a valuable framework for redirecting attention to the horse's quality of life and, when combined with evolving equitation science knowledge, lays the groundwork for improving on traditional horse facility models. This holistic design approach could be deployed by architects to authentically progress a good life for horses.

Keywords: Horses, environment, housing, facility design, welfare, quality of life

Return to programme

PAS10

SHARING HORSE CARE KNOWLEDGE IN CULTURALLY APPLICABLE METHODS TO ENGAGE NATIVE AMERICAN TRIBAL COMMUNITIES TO PROACTIVELY CONTRIBUTE TO THEIR HORSES' BEST LIVES

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The horse is culturally significant to many Arizona Native American tribes, but tribal acceptance of outside educational resources requires an established relationship with the tribal communities. Arizona Cooperative Extension has worked to become a trusted resource. Extension has recognized that hands-on training and direct, small-group conversations are more effective for conveying knowledge and ensuring its practical application in daily horse care. Additionally, preservation of tribal traditions, land, and the active involvement of their youth are central to tribal values. Educational strategies were adapted to tribal needs, utilizing a variety of teaching methods while acknowledging tribal culture. Multiple educational topics and formats were delivered to Apache, Navajo, Hopi, Hualapai, and other tribal communities. These incorporated vital hands-on education in biosecurity, horse handling, nutritional needs, vaccinations, and overall horse stewardship education. Methods included: 1) acknowledging existing tribal horse practices and traditions while delivering educational materials using innovative teaching methods and integrating relevant science; and 2) building tribal participants' confidence to apply learned skills to their own horses. While most extension programs can be evaluated with Likert scales and written feedback, this is not the case for tribal communities. Traditional paper or electronic survey methods to evaluate impact are not effective, therefore, qualitative data was collected through group discussions and storytelling at the end of workshops. Stories illuminated the successes, barriers, implementation, outcomes, and lessons learned, thus providing contextual information about program impact and actions taken to improve horse welfare. Between 2021-2023, educational workshops reached over 500 tribal community members, providing 80 hours of hands-on training and lectures on biosecurity, nutrition, health, and horse stewardship. Fifty percent of participants of multiple workshops indicated they have implemented practices learned, and 100% indicated the information was valuable. Extension and tribal collaborations have since resulted in over $450,000 (USD) in grant funding to further expand educational tribal partnerships, including initiating programming for Gila River, White Mountain, and Tohono O'odham tribes. Arizona Extension has responded to the tribal community's need for more interactive and hands-on training. Access to equine knowledge/skills has empowered the critically underserved tribal communities, giving them confidence to apply better care for their horses, thus improving the quality of life for tribal horses. These efforts highlight Extension's work to respect tribal commitment to preserving their land and culture, while educating tribal members to help their horses live their best lives.

Lay person message: The horse is culturally significant to many Arizona Native American tribes, but acceptance of educational resources depends on an established relationship with tribal communities. Arizona Cooperative Extension has worked to become a trusted resource for horse health/preventative care knowledge. By adapting educational strategies to include traditional tribal values, access and adoption of improved equine practices by tribal members has increased. This has empowered tribal communities to apply new skills to their horse stewardship so their horses can live their best lives.

Keywords: Native American tribes, Arizona Cooperative Extension, horses, stewardship, hands-on education, culturally applicable

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PAS11

IDENTIFICATION OF EQUINE FARMER'S NEEDS AND SOLUTIONS IN THE AREAS OF HEALTH AND WELFARE OF EQUIDAE, SOCIO-ECONOMICS AND SUSTAINABILITY

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The present study was conducted within the large, collaborative project EUnetHorse, a project aiming at identifying needs and solutions of equine farmers of nine European countries in the areas of 1) health and welfare of equidae, 2) socio-economics, and 3) sustainability, and a subsequent knowledge exchange and transfer to practitioners (including farmers, trainers, advisors). Here, we present results of the first 26 farmers interviewed from Germany, to identify needs and existing solutions in the above areas. Interviews were followed a pre-defined questionnaire that was identical for all participating countries. Farmers were selected for the interviews to represent all sectors of equine farming and equestrian disciplines. Subsequently, the needs mentioned by the farmers were prioritized by 15 practitioners and equine experts. Farms run by women were similarly likely to have made a profit in the past 5 years compared to farms run by men or mixed-gender couples (ANOVA: $F_{1,35}$=2,21; p=0.2809). The majority of farmers identified needs for their operations in the areas of socio-economics (60% of interviewed farmers), but the proportion of those mentioning needs related to health and welfare of equidae (45%) only tended to be lower (Binomial test P<Z=0.0562), while topics related to sustainability played a comparably minor role (25%). Prioritized welfare-related needs were: 1) transfer of science into practice (husbandry, feeding, training), 2) basic education for all horse-people considering animal welfare in housing, feeding and handling, and 3a (tie with 3b)) education and training of veterinarians in relation to behaviour and needs of horses, 3b) adherence to and enforcement of existing welfare guidelines. Additionally, highly ranked needs included: introduction of legally binding regulations rather than non-mandatory guidelines, change in regulations that hinder reconstruction of existing barns towards more welfare-friendly husbandry systems, a change in the way judges are assigned/invited to competitions to avoid bias, and greater consideration of equine needs and evidence-based practices with regard to husbandry and feeding management, as well as handling and training. While it is not surprising, that socio-economic aspects play a major role for farmers making a living of their activities, the high proportion of welfare issues is remarkable. Results show that with regard to equine welfare issues, there is a high level of awareness among equine farmers, and farmers from across various equestrian activities and disciplines see a need for improvement in welfare-related matters. With regard to the social license to operate, it will be paramount to tackle these equine welfare issues.

Lay person message: Besides socio-economic challenges, issues related to equine welfare present a major concern to equine farmers in Germany, regardless of their area of specialisation. The interviewed farmers suggested that in order to improve horses' lives, existing regulations and guidelines need to be revised as well as implementation of existing guidelines into practice needs to be improved.

Keywords: Equine farmers, needs, welfare, socio-economics, sustainability, social license to operate

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THEME 6 SUSTAINABLE AND ETHICAL EQUINE PRACTICE sponsored by The Horse Trust

PL6

HOW SHOULD WE THINK ABOUT EQUINE ETHICS IN THE ERA OF ONE HEALTH AND ONE WELFARE?

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Human use of non-human animals can no longer be considered in isolation from the environment in which such use occurs. Whether non-human animals be farmed, kept as companions, or used for recreation and in competition, it is undeniable that the impact of human:animal interactions is extensive. Animal ethics and environmental ethics, which used to be distinct, have become entwined. When we consider ethical aspects of milk production, for example, we now think not only about welfare impacts upon dairy cows but also about the environmental impacts of the methane which those cows produce. When we think about the welfare of companion dogs and the need to prevent or treat parasitic infections, we now think not only about canine health but also about the impact of topically applied parasiticidal drugs on water courses. And when we think about keeping horses we now think not only about welfare-optimising management but also about how to reduce the vast amount of plastic wrapping in which their bedding and feed has historically been supplied.

Sustainability is at the core of all of these considerations, and of public discourse, at a societal level. Many people now follow a vegan diet out of concern not primarily for animal welfare, but about the impact on climate change of using animal meat as a source of protein for humans. Using veterinary antimicrobials responsibly has become an ethical imperative on which sustainable use of antibiotics in human medicine depends. And to take an equestrian example, in areas of special scientific interest in England ponies are now being used to help sustain rare plant populations through grazing.

In the equestrian context, concerns about sustainability apply not only at a societal but also at an individual horse level. The current debate about the 'social license' to use horses in sport has demonstrated that both equestrian and non-equestrian stakeholders no longer find acceptable an attitude which essentially treats horses as 'disposable'. A variety of ethical approaches to human: horse interactions underwrite such concerns. Horses - like all vertebrates and increasing numbers of invertebrates - are now recognised not only by scientists but by members of the public and of the equestrian community as sentient individuals who (to put a deontological spin on it) are subjects of their own lives and have an interest in their quality of life; who (to put a Virtue Ethics spin on it) are capable of flourishing; and who (to borrow Rollin's idea of 'Telos' and to put a 'respect for nature' ethical spin on it) have their own innate characteristics which themselves form part of the ecosystem.

Such ethical approaches are all valid and philosophically interesting, and we could consider human use of horses from the perspective of any one of them. But having at our disposal a variety of ethical theories which essentially conflict which each other and which offer a range of possible conclusions can be confusing to us as individuals concerned with optimising equine welfare. It is also not helpful when we are trying to justify to ourselves and in public the sustainable, ethical basis of human use of horses for leisure and sport. Consistently applying an agreed ethical framework, in contrast, enables us to make use of elements of multiple ethical theories to reach practical, applied decisions using a transparent method which can be explained to stakeholders, and which has equine wellbeing at its core. One such framework is Campbell's 'Ethical Framework for the use of Horses in Sport'. This works stepwise to define the ethical question; analyse the evidence base; identify stakeholders' interests; undertake a harm:benefit analysis; apply the three central tenets of the framework, and formulate conclusions and recommendations. The three central tenets are (i) Minimisation of negative welfare and maximisation of positive welfare for horses, (ii) Identification and prevention of avoidable, unnecessary risks to horses and (iii)

Compliance with governing body regulations and the law. Recently, the framework was applied to the issue of whether the use of omeprazole should be allowed during equestrian competition. We concluded that where regulation prohibits the use of omeprazole during competition, the withholding period should be no longer than one day. Therefore, revision of regulations around the use of omeprazole during competition by those governing bodies who currently require more than a one-day withdrawal is necessary to safeguard the ethical use of horses in sport. However, we also noted that - given the high incidence of equine gastric ulcer syndrome (EGUS) in competition horses - an overarching ethical question remains about whether a situation where equine athletes require anti-ulcer medication to train and compete is sustainable and ethically defensible.

One stress-inducing aspect of the management of elite competition horses is their international transportation, by air or road. That practice in itself raises questions about sustainability, equine welfare, and thereby the ethical justifiability of international equine sport. If Campbell's ethical framework is applied to this question, we find that the stakeholders are many, and their interests diverse. The welfare of horses is protected by international legislation and sports' regulations, and it is possible both to minimise negative and maximise positive welfare effects and to identify and avoid various equine health, disease and welfare risks associated with long-distance transportation. However, the welfare of any given horse would always be better served by not being transported internationally. The alternative might be for riders only to travel and to use local horses at each venue. But whether being ridden by unfamiliar riders is more detrimental to the welfare of individual horses than being transported internationally and ridden by familiar riders is likely to vary between horses and is difficult to ascertain. Further evidence about the annual impact on the environment of the international transportation of horses for competition is also required. In this particular example, scientific uncertainty prevents us reaching an immediate definitive conclusion. However, having a tool which enables us to direct ethical thinking within equestrian communities, to challenge existing views, and to explain the welfare-based rationale for decision making to external stakeholders is important and useful.

Lay person message: Animal ethics and environmental ethics are interrelated, with concerns about sustainability at the centre of a 'one welfare' approach to human:horse interactions. Challenges to the social license for using horses in leisure and sport reflect societal unease about whether such use is compatible with providing 'a good life' for individual horses, and about the environmental impacts of such activities. Application of Campbell's framework directs consistent ethical thinking within equestrian communities and communication with external stakeholders.

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RP19

CARBON FOOTPRINT OF A DUTCH JUMPING AND DRESSAGE HORSE

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Sustainability is gaining growing attention within the equine sector. Sustainability consists of various subjects including feed and nutrition, resource efficiency, animal welfare, carbon footprint (CFP) and biodiversity, for example. Studies in horse research focus mainly on behaviour and welfare. Little information is available about the environmental impact of equids, and the few studies that exist are principally concerned with local impact, such as nitrogen leaching or ammonia concentrations in bedding, but overall greenhouse gas emissions (GHG) are unknown. Therefore, this study aimed to develop a model to calculate the GHG emissions of a sport horse. Using the developed model, the CFP of a sport horse in the Netherlands was calculated and the GHG hotspots identified. The model was developed based on life cycle analyses (LCA) approach where various models and standards were applied. In order to calculate the CFP throughout the whole life of a sport horse three main stages, reproduction, raising, and competition were considered. It is important to take the first two stages into account, hence otherwise the history is not taken into consideration and therefore the CFP would be incomplete. As case studies, the CFP for both a dressage horse and jumping horse were determined. Data were collected on reproduction, raising, level of training and feed production and feed intake in all phases. Preliminary results showed that in the first two stages (reproduction and raising) the CFP varies from 2204 to 7081 kg CO_2-equivalents (CO_2-eq) per animal per year, depending on the life stage of the horse. Emissions from feed production contribute most to the CFP in both stages. When the animal enters the competition stage, the CFP varies from 6.316 to 55.962 kg CO2- eq per animal per year. Annual output depends on whether the animal is transported for competition. In fact, in the competition stage, transport contributed most to the total GHG emissions, followed by feed production emissions. Smaller contributions come from manure management and enteric fermentation. Besides its environmental impact transport poses other challenges and can have an impact on equine health and welfare. Some of the health and welfare issues could be at higher risk due to global warming and this might impair a Good Life for horses. This study was a first attempt to calculate the CFP of a Dutch sport horse competing internationally. The equine sector, however, is diverse and consists of more disciplines and different types of housing and management. More research is needed to create a better understanding of the sector's impact.

Lay person message: There is not much known about the environmental impact of horses in terms of greenhouse gas emissions. This study was a first attempt to calculate the greenhouse gas emission of a Dutch sport horse competing internationally. Results show that travel is one of the main contributors of the total greenhouse gas emissions.

Keywords: Equine, climate, carbon footprint, lifecycle assessment, greenhouse gas emission

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RP20

HORSE OWNER KNOWLEDGE OF FUNDAMENTAL CARE AND THEIR PERCEPTIONS ON THE IMPLEMENTATION OF A MANDATORY CERTIFICATE OF KNOWLEDGE

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There is increasing public concern about horse welfare and whilst media attention is currently focused on sports horses, the welfare of horses used for other purposes should not be neglected. Mandatory certification of owners' horse knowledge has been suggested as a way of safeguarding horse welfare. The aim of this study was to first, determine the extent of owners' fundamental knowledge of equine care, second, gain their opinions on the implementation of a mandatory certificate of knowledge in their country and third, to investigate the impact of certification on horse owner knowledge. An online survey comprising 23 questions (18 closed, 5 open), distributed worldwide via snowball sampling, was completed by 1847 horse owners all 18+ years old from 17 different countries. Almost all (96%, n=1781) completed surveys were usable. Just over half (52%) of participants held a current equine knowledge certification, and 59% believed a mandatory certificate of knowledge should be necessary to buy, own, or sell a horse. Horse owners with an equine certificate of knowledge were more likely to be in favour of a mandatory certificate than those without (X^2=50.79, d.f.=1, p<0.0001). However, concerningly the mean correctly answered knowledge questions was 68%, indicating that a third of horse owners lacked fundamental horse care knowledge. Further examination of incorrect answers to questions aligned with the Five Domains Model Framework indicated that participating horse owners showed the least understanding in the behavioural interactions domain (domain 4) (ANOVA F4,24=4.98, p<0.01), specifically in relation to pain recognition and learning theory terminology. Arguably this deficit in knowledge and likely application increases the risk of owners using misinformed or inappropriate techniques to manage horse behaviour and training, predisposing the horse to experiencing a sub optimal quality of life. Although overall no significant difference was found between the total correct scores of horse owners with or without a certificate (Mann-Whitney W=351.5, p>0.05), a series of Chi-squared tests revealed that for the more complex questions, horse owners with a certificate scored better than those without (all p<0.05). This study suggests that a certificate is likely an effective way of improving owners fundamental knowledge of horse management. Deficits in learning theory knowledge and application could be addressed through the use of a competency-based certificate. Further work is needed to develop an evidence-based assessment framework that is appealing to all equestrian stakeholders if mandatory certification of horse owners is to become an effective tool for improving horse welfare and quality of life.

Lay person message: This study indicated that the majority of horse owners are in favour of mandatory education to improve equine welfare. Whilst horse owners showed a lack of fundamental knowledge about complex aspects of horse care, those already with a certificate had slightly better knowledge. This suggests that a certificate has the potential to contribute to better understanding of how to care for and train a horse. Making education accessible and compulsory for owners can promote the use of evidence-based management, creating a good life for all horses both when working and in the other 23 hours.

Keywords: Welfare, horse owner, knowledge, certification, learning theory, social license to operate

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RP21

THE WICKED SITUATION OF HORSE WELFARE: FINDING RECOMMENDATIONS FOR THE FUTURE

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Disparate attitudes towards animal welfare threaten the horse sector's social licence. It is therefore important that policies and practices demonstrate an intent to safeguard welfare. This study provided preliminary insight into experienced horse sector participants' perspectives on potential future welfare improvements, and whether consensus was possible. The study, informed by Appreciative Inquiry, consisted of an on-line survey and a two-round e-Delphi. The survey, distributed using the snowballing technique, asked respondents (n=681; 91% Australian) what current welfare-related practices worked well. Survey analysis identified four themes of welfare-related practices that worked well: Managing venues; Feeding and watering horses; Monitoring fitness to participate; and Considering horse behaviours. These results informed the first round of the e-Delphi. Panelists (n=22; 100% Australian) were asked to imagine they were in 2028 and to describe which practices they would prioritise for improvement, and how they had been improved. Venue management was panelists' main priority. Thematic analysis of first-round results generated four welfare-related policy recommendations: Governance, policies and practices should incorporate equine physical, mental, and social indicators; Capacity-building for horse welfare should include education; Assessment of equine fitness to participate criteria should incorporate mental, physical, and training indicators; Management of activity venues should be informed by evidence-based information. Panelists indicated their level of agreement and their rating of the importance and the feasibility of implementation of each recommendation. Consensus (>60%) was reached for each recommendation. Governance and capacity building were rated as very important or important and very feasible or feasible by the majority of panelists (>80%). Fitness to participate and venue management were rated very important or important by all panelists, but feasibility ratings varied, with 33% rating them as neither feasible/unfeasible, or unfeasible. Consensus regarding potential future-orientated welfare-related policy and practices is achievable. These preliminary findings could inform the development of policies and practices aiming to provide a good life for horses and reduce risks to the social licence.

Lay person message: The horse sector must maintain its social licence to operate. This preliminary study asked experienced horse sector participants what current welfare practices work well at horse sports venues, to identify future potential welfare improvements and areas of policy development. Future practices identified to provide a good life for horses were managing venues, considering behaviours, fitness to participate, and provision of feed and water. Areas of policy focus were governance, fitness to participate, venue management, and capacity building.

Keywords: Animal welfare, animal wellbeing, equestrian, horse racing, Delphi

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LT7

HORSES' BEHAVIOURAL RESPONSES TO EQUINE ASSISTED COACHING: IMPLICATIONS FOR SAFETY

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While there is a growing body of evidence on human benefits of animal-assisted interventions, relatively little research has been conducted on how horses perceive these interventions. The aim of this study was to examine the relationship between noticeable behaviours of horses during equine assisted coaching indicative of their affective state. Horses were monitored for two months, and behaviour of each coaching session was scored. Twenty-one behaviours were selected for the study; scoring was simplified using three categories: the behaviour was not seen at all, occasionally or regularly. Equine assisted coaches underwent training in scoring utilizing this approach. Principal Component Analysis was used to extract underlying factors of the behavioural responses of horses during equine assisted coaching. In order to determine the influence of equine and session related variables on the PCA factor scores, multiple linear regression was performed, using information criteria to determine the important variables. The study included 94 horses that were continuously monitored for a period of two months resulting in data of 423 coaching sessions. Half of the horses were mare, half were gelding. The average age of the horses was 12 (range 2-28) years. The PCA revealed six factors with eigenvalue above 1 explaining 64 percent of the total variation. The factors were labelled as: comfortable, tense, release tension, restless, agitated, detached. Scores were rescaled on a scale of 1-10. The average (SDEV) scores for the factors were: 'comfortable': 7.38(1.78), 'tense': 2.90(1.64), 'release tension': 3.44(1.58), 'restless': 3.59(1.72), 'agitated': 3.00(1.88), 'detached': 3.42(2.20). There was no association with the age of horses, but a known medical problem was negatively associated with 'comfortable' and 'detached' and positively associated with 'agitated'. Limited access to paddock or pasture was positively associated with 'comfortable', while limited access to roughage was negatively associated with 'comfortable'. There was a negative association between the familiarity of the coach with the horse and 'detached' ($p<0.05$). Results give new insights in how horses cope with equine assisted coaching. Awareness of the horses' affective state will positively influence horse welfare in equine assisted coaching.

Lay person message: Knowledge of how horses perceive equine assisted coaching is beneficial for the welfare and safety of both the client and the horse. This study revealed how behavioural responses revealed different emotional states during the session. Key characteristics of horses, their management and the coach are of influence to the emotional states of the horses.

Keywords: Equine assisted coaching, welfare, positive emotions, behaviour

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LT8

A MOVE IN THE RIGHT DIRECTION: TRACKING THE TRACEABILITY OF UK THOROUGHBREDS

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Horse racing is subject to public scrutiny questioning if thoroughbreds (TBs) have a good life. Within British horse racing, the Horse Welfare Board's "A life well lived" strategy provides a blueprint for the welfare of TBs. Ensuring industry infrastructure can provide lifetime responsibility for TBs is a core aim of this strategy; however, to be able to facilitate this, accurate traceability of horses bred for racing across their racing and post-racing careers is essential. At birth, TB foals are registered with a relevant stud book, however, for horses which exit training, or transition to a second career/s, tracking changes in circumstances is reliant on owner/keeper compliance to update studbook information. This project aims to establish a current population density model for the number and status: ownership and use of UK resident TBs, to provide an accurate representation of the TB population and identify areas where additional research and education initiatives are required to enhance horse welfare. Population estimates generally generate census data to create accurate population density models; therefore, a census methodology was employed via an online survey distributed through equestrian stakeholder organisations and media campaigns from May and December 2023. Frequency analysis identified patterns in passport compliance, knowledge and understanding of current systems, and profiled TB demographics: age, use, and history; Chi-squared analyses evaluated differences in passport registration compliance related to the activities participated in. Mid-point results are presented here; 5505 TBs were registered in the census by 31/10/24. Most horses were geldings (74%), aged between 5-14 years (63%); 90% were owned, 4% were loaned and 6% were resident with a keeper. Of these, 54% had been in the same home for >3 years, with most owners (66%) having kept a TB previously. Ninety-eight percent of horses had a passport, but only 64% of these were in their current owner's name despite 91% of respondents being aware that they should have changed their horse's ownership details. Leisure riding, hacking, and unaffiliated competition were the most common activities participated in; no significant differences in registration compliance was found between activities. The final results will provide an accurate representation of the TB population and identify areas where additional research and education initiatives are required to improve lifetime traceability and support all stakeholders to ensure all TBs have a life well lived.

Lay person message: The welfare of TBs within and after racing is often questioned by the public. A census was undertaken to generate accurate profile the UK TB population. Most horses were owned and resident in non-competitive homes. Most owners have their TB's passport but 36% had not changed this into their name. Accurate records are needed to support future education, research, and strategy to safeguard TB welfare.

Keywords: TB Census, racehorse welfare, biosecurity, horse owner responsibility, social license to operate

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LT9

TRANSFORMING RETRAINING: USING MULTIDISCIPLINARY EXPERT CONSENSUS TO IMPROVE SUCCESS RATES IN RACEHORSE'S SECOND CAREERS

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Following their racing career, retirement requires racehorses to adapt to a new lifestyle and this transition requires considerable physical and mental adaptation from the horse. An optimal early retraining process is of paramount importance to maximise the racehorse's potential to have a good quality of life beyond racing. To facilitate this, it is imperative to identify how this transition is managed by those experienced in supporting retraining racehorses. Global stakeholders experienced in retraining racehorses were surveyed online to identify common themes and challenges of the transition and retraining process. Participants were recruited through racing social media and snowball sampling; 100 complete responses met inclusion criteria and were taken forward for analysis (margin of error: ±10% at the 95% confidence level). The survey profiled retrainers' qualifications and experience and gathered information on behavioural and physical challenges for racehorses leaving training, and retrainers decision-making during transition. Data were analysed using frequency analysis and conventional inductive content analysis. Respondents were experienced retrainers, involved in retraining for >5 years, for >5 horses. Most (70%) were UK-based, and the majority had some prior link to the racing industry and practical experience across the equestrian sector rather than a formal qualification. The top three physical challenges identified as being always or very likely to be influential to retraining, were time spent in the paddock/at free exercise (86%), different types of work (85%) and changes in the horse's shape (79%). The corresponding top behavioural challenges were a change in time spent in the paddock/at free exercise (82%), a change in feeding concentrates (82%), and a change of daily routine from racing (78%). During the retraining process, respondents more commonly assessed horses' behaviour than physical progress. Respondents identified 4 themes which they felt, based on their experiences, were key to successful retraining: 1) time, 2) people, 3) horse's history, and 4) approach. These preliminary results offer an insight into common approaches to racehorse retraining used by experienced professionals and provide a first step in developing an individual, objective and evidence-based 'training needs analysis' to help facilitate suitable second careers for individual racehorses after transition.

Lay person message: Optimising long-term outcomes for former racehorses to provide them with suitable homes after they leave racing is a priority across horse racing industry. Surveying experienced retrainers identified horse behaviour as a key measure of progress in transition and changes in turnout, nutrition routines and work were challenging during retraining. Evidence-informed early retraining can support successful transition and increase racehorses' potential for a good life beyond racing by preparing them for suitable second careers.

Keywords: Racehorse welfare, retraining racehorses, racehorse to riding horse, OTTB, Social Licence to Operate

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LT10

PRELIMINARY STUDY ON THE INFLUENCE OF HORSE TEMPERAMENT ON BEHAVIOURAL RESPONSES TO BEING BLINDFOLDED

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Blindfolding removes visual stimuli ostensibly to make horses more reliant on the handler in emergencies such as leading from a burning barn. An earlier study showed horses took longer to lead and displayed more avoidance and resistance behaviours when blindfolded. However, a large variation in individual response was noted which could be due to temperament. It was hypothesized that horses categorized by their riders as reactive would display more avoidance and resistance behaviours when blindfolded compared to horses who are categorized as non-reactive. Riders selected personality traits from a list of 10 paired words describing their horse as reactive or non-reactive (e.g. active or easy-going). A personality score (Pscore) was calculated for each horse by subtracting the sum of reactive traits from non-reactive traits (i.e. a higher score indicated a less reactive personality). Horses (n=33) then were led both blindfolded and unblindfolded from their stall and through an obstacle course consisting of weaving through cones, backing through a channel, walking over a tarp and walking through a narrow gate. Time taken to complete the tests was recorded along with lead rope pressure (IPOS tensiometer) and behaviour. The influence of Pscore on horse responses was assessed by Spearman correlations. In the unblindfolded condition horses with higher Pscores required less lead rope pressure to lead from the stall ($r(26)=-0.51$, $p=0.006$) and to cross the tarp ($r(23)=0-.40$, $p=0.049$) but took more time to weave through cones ($r(25)=0.45$, $p=0.02$) than horses with lower Pscores. When blindfolded, horses with higher Pscores required more lead rope pressure to lead out of stall ($r(31)=0.40$, $p=0.03$) but were less actively avoidant ($r(31)=-0.51$, $p=0.003$) than horses with lower Pscores. These preliminary results may seem counterintuitive but do highlight the interplay between personality and coping style. Earlier results showed horses took more time to lead with more avoidance behaviours when blindfolded, and here it is shown that temperament appears to play a role in individual responses. Compared to more reactive horses, less reactive horses showed more resistance while being led from their stall blindfolded but took more time to weave through cones while unblindfolded even though they were less resistant to leaving their stall or crossing the tarp. Knowing how personality influences horse behaviour is a key aspect in appropriate management techniques.

Lay person message: Blindfolding horses results in more resistance behaviours and longer leading times. Horse personality influences individual responses with less reactive horses showing less resistance to leaving their stall unblindfolded but more resistance when blindfolded compared to more reactive horses. Accounting for individual effects of personality can assist in selecting handling techniques that ensure best outcomes with the least stress. Although less reactive horses may appear more accepting of various requests, this coping style may mask underlying stress responses. If these go unrecognized or misinterpreted it may lead to escalating punitive actions from the handler which directly affects horse welfare.

Keywords: personality, reactive, individual responses, emergency situations

Return to programme

LT11

SUSTAINABILITY IN EQUINE SCIENCE: A SYSTEMATIC REVIEW

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A Systematic Review was undertaken to map sustainable development endeavors within scientific work related to the equine industry. Following the PRISMA 2020 statement, screening, retrieval, and eligibility control yielded in total 222 records in Web of Science and 160 records in Scopus. Out of 207 eligible abstracts, 129 full records (62%) were accessible while five (5) records did not provide an abstract. A preliminary thematic analysis showed that all three pillars of sustainability (environmental, social and economic) were represented; topics related to One Health and specifically equine parasites dominated the search yield (30%). These topics included parasite occurrence and community descriptions; monitoring, prevention, and selective treatments; and resistance to chemical and biological control measures. Topics related to human health and safety included issues on zoonotic disease, occupational health, and equine-assisted therapy. The topic of equine welfare frequently occurred (11%), not only relating to horses in sport or leisure but also to horses, donkeys and mules used as working animals to facilitate farming and transport. Veterinary studies on equine diseases, surgical procedures, and medical treatments are also encountered (9.2%). The search yield also covered topics related to landscape use (8.7%), where biodiversity conservation opportunities and other societal needs such as potential conflicts between different recreational uses of the same spatial areas and landscape structures. Regarding the topic of biodiversity, grassland management occurred as an important aspect of equine activities together with environmental impact in terms of greenhouse gas emissions and belowground carbon stabilisation. The economic pillar of sustainability was represented by equine tourism (3.9%), breeding (2.9%), meat and milk production (1.0%). The review identifies a broad scope for further studies of sustainability within the equine sector, both scientifically and practically. A transition towards more sustainable governance of horses and their management could be advanced by scientifically applying the concepts of three-dimensional sustainability more systematically and by establishing sustainability criteria also incorporating values from One Welfare and Social Licence to Operate.

Lay person message: A literature review on sustainability in the horse industry showed that most scientific articles covered issues on parasites in horses. Other appearing topics were human health and safety, equine welfare related to horses, donkeys and mules used as working animals, veterinary studies, grassland management, biodiversity conservation, land-use conflicts, equine tourism, breeding, meat and milk production, and climate impact in the articles found. Further attention to sustainability within the horse industry, combining the three pillars of sustainability with aspects of equine welfare and social license to operate may contribute to more sustainable governance and practices and a Good Life for horses.

Keywords: Sustainability, development goals, equine, One Welfare, One Health

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LT12

LESSONS LEARNT FROM HORSE-RELATED HUMAN FATALITIES: ACCIDENT ANALYSIS USING HFACS-EQUESTRIANISM

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Equestrianism has an opportunity to learn lessons relating to safer human-horse interactions from those who no longer have a voice by drawing data from the investigation of horse-related human fatalities and participating in accident analysis. Horse-related accidents are often not examined for the purpose of developing safer future risk mitigation practice, due to the belief that horses are simply dangerous. This study analysed data from the Australian National Coroners Information System (NCIS) relating to fatalities involving human-horse interactions that occurred between 2000 and 2020. A total of 50 horse-related human fatalities were identified from the NCIS database for analysis using a validated accident analysis framework. The aim of the study was to identify what could be learned and potentially done differently to prevent future fatalities. A detailed frequency analysis of the underlying causes identified from the coronial investigation using Human Factors Analysis and Classification System-Equestrianism (HFACS-Eq), a validated accident analysis model specifically designed for equestrianism revealed that most fatalities involved falls 56% (n=28) resulting in blunt force trauma 96% (n=48), with the horse as causal factor 90% (n=45). Further analysis highlighted fatalities that involved females 45.5% (n=10) were more frequently associated with unsafe human acts than 17.9% (n=5) fatalities that involved males (p=0.04). Further, as a causal factor, the *horse sentient-living being,* were more frequently associated with non-work 100% (n=27) related fatalities, compared to work 78.3% (n=18) related fatalities (p=0.01). Finally, analysis highlighted the environment, surroundings, or location in which the human-horse dyad interacted as a critical causation factor. The human-horse dyad in equestrianism is complex and unique when compared to other high-risk work and non-work activities. A better understanding of the risk factors involved in handling and riding horses, coupled with a model to help mitigate that risk will set us on the path to a good life for horses because human safety and horse welfare are inextricably linked.

Lay person message: Accident analysis frameworks are widely used by high-risk industries to mitigate future risk. Horse-related accidents are often not examined for the purpose of developing safer future risk mitigation practice, due to the belief that horses are simply dangerous. An equestrian specific, accident analysis model Human Factors Analysis and Classification System-Equestrianism (HFACS-Eq) was used to examine human fatality data associated with human-horse interactions from 2000-2020. Study results highlighted the importance of understanding the individual needs of the human-horse dyad, the intrinsic link between human safety-horse welfare and the critical role the environment and surrounds play for risk management purposes.

Keywords: Horses, human fatality, coronial data, safety, risk, Work Health & Safety

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LT13

A SCORING SYSTEM AND KEY FEATURES TO GUIDE GRADING QUALITY OF MOVEMENT

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A good life for horses should include good health care, yet the lack of suitable outcome measures for functional movement jeopardizes that. Creating a new outcome measure for quality of movement will enhance treatment monitoring and evidence-based practice in equine physiotherapy and rehabilitation. A previous survey identified frequently used in-hand locomotory movements for assessing performance management or rehabilitation cases (including walk, trot, canter figures on different surfaces). The present study aimed to first identify suitable anchor wording and a scoring system for grading quality of movement, and second to create a list of the most important features of movement quality to guide the scoring of each movement, which could then be refined into directives. Ten expert equine physiotherapists (from 5 countries) took part in 3 rounds of surveys (Delphi process). In each round the experts could provide comments and alternative suggestions. Descriptive statistics (% and bar graphs) and a summary of major themes from the comments were presented back to the panel in subsequent survey rounds. Consensus was defined as greater than 75% agreement. Word frequency clouds and thematic analysis was used for qualitative data. The preferred anchor wording was *quality of movement*, with 8 out of 10 (80%) experts liking or strongly liking it. The chosen grading words were *optimal, good, mild, moderate and severe movement dysfunction* favoured by 8 out of 9 (88%) experts liking or strongly liking it. The experts were provided with a list of 147 features relating to equine movement analysis they could choose from or add to. The number of important features was reduced each round, some features achieved greater than 75% agreement in the third round. In the final 2 rounds the experts reworded the key features to create a flowing summary sentence or *directive.* However, translating observational expertise of practitioners into explicit language proved challenged. Words carry different meanings, some specific to a task or discipline, others dependent on the background experiences of the assessor. While directives need to be concise, generic language does not provide meaningful guidance, so a careful balance must be struck. Although consensus on the directives was not reached, they served as a valuable starting point for refinement. A good life for horses includes good quality of movement. Poor quality of movement can indicate pain and dysfunction. Accurately grading changes in movement quality under various field conditions will empower equestrians when making decisions related to welfare.

Lay person summary: This study used repeated surveys to determine anchor wording, grading terms and key movement features as a step in the development of a new measure for equine quality of movement. The panel of 10 expert physiotherapists choose a grading system and narrowed down the most important features to observe in different movements over 3 rounds of surveys. While achieving consensus on directives was challenging, the results provide a foundation for more precise assessment of movement.

Keywords: Quality of movement, equine physiotherapy, rehabilitation, grading system, movement features

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RP22

POLO: WHAT DO WE KNOW NOW?

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Increasing numbers of thoroughbreds are playing Polo around the world. High top speeds, large cardiovascular capacities, agility, and temperament make them ideally suited to the sport. Polo is also supported by several racehorse retraining programmes globally, encouraging a life after racing. Academic interest in Polo is growing; spanning performance analysis, exercise physiology and biomechanics, with an increasing focus upon how this knowledge can best support equine training and performance. Polo affords a strong data collection opportunity for a range of equitation and sports scientists. A narrative review of research to date was conducted, given the relative paucity of literature in the area and its largely descriptive nature. Evidence related to equine performance but not veterinary factors is used to benchmark the demands of the sport, and aid successful retraining transitions. This includes spatiotemporal characteristics of the game as assessed by global positioning systems, and how these data may differ between levels of play (expressed as effect sizes), and player sex (Open and Women's Polo). Spatiotemporal parameters can be reliably assessed (ICC: 0.95 to 1.00; CV: 1.1% to 9.1%) with increased distance per chukka and average and maximum speeds attained at higher levels of the game. Players will typically 'half-chukka' horses as level of play increases, with the aim of simultaneously increasing playing speed and maximising recovery. Open and Women's Polo display distinct spatiotemporal characteristics, even when matched on player handicap. Significant differences occurred in distance covered ($p<0.001$; ES = 1.54, *Large*), average speed ($p<0.02$; ES = 0.30, *Small*) and average maximum speed ($p<0.001$; ES = 1.39, *Large*). Polo presents a novel opportunity to a range of scientists, in that it combines elements of traditional team sports with the challenges of data collection in an equestrian environment. The playing of multiple horses per game and tournaments facilitate curation of sufficiently powered datasets. There is scope to increase both the depth and breadth of investigations within Polo, especially as technology continues to permeate equestrian sport and equitation science research, particularly if equitation, sports, and veterinary scientists collaborate. Understanding the temporal, biomechanical, physiological, and behavioural demands of Polo through critical review of the literature and application of objective scientific methodologies such as sports performance analysis will enable a thorough evaluation of a horse's suitability for polo as a (second) career, therefore increases the chances of it the individual experiencing a Good Life.

Lay person message: Polo presents an opportunity for collaboration between equitation, sport and veterinary scientists, providing an idiosyncratic data collection environment with multiple horses and multiple riders under relatively standardised conditions. Polo can foster a Good Life for retrained racehorses due to the spatiotemporal demands of the sport and thoroughbreds' physiological and performance characteristics.

Keywords: Polo, Thoroughbred, performance analysis

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RP23

HOW DOES THE INTERNATIONAL EQUESTRIAN COMMUNITY VIEW THE SUITABILITY AND VERSATILITY OF RETIRED THOROUGHBRED RACEHORSES IN A SECOND CAREER?

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There is international public concern regarding Thoroughbred (TB) racehorses' lives after racing. This study explored perceptions of equestrian stakeholders regarding retired off-the-track TB racehorses (OTTBs) in a second ridden career and barriers that exist. Qualitative data were initially collected via panel discussions with equestrian stakeholders (n=8; owners of OTTB, racehorse re-trainers and an equine veterinary surgeon), analysed using formal thematic analysis. Themes identified included OTTB's work ethic and trainability; perceptions around injuries, management, and life before racing; temperament and athletic ability; impact of visuals of OTTBs in the public domain; cost of OTTBs; rider and handler experience and owner expectations. The results informed development of an online survey (35 questions), open between July-August 2021. The survey yielded 3,636 responses from respondents in 39 countries, 92% of whom had experience working with/ riding OTTBs. Over 60% (n=2,197) disagreed that OTTBs are high maintenance or cost more to keep compared to other horses, and 72% of respondents considered they cost less to buy compared to other horses. Most (98.4%) considered that retired OTTBs had physical capacity to embark upon a second career regardless of racing discipline (flat or jump) or racing career length. Almost all (97.7%) respondents believed that OTTBs were adaptable, trainable and willing to learn and considered they would be most suitable for teaching experienced riders (95.2%), used at an equestrian college (85.7%) or for teaching stable management (85.5%) with fewest considering OTTBs were suitable for teaching novice riders (39.5%). There were differences in opinion between equine professionals / non-professionals regarding the discipline OTTBs were most suited for but eventing was the most commonly selected response in both groups. Most (84.8%) agreed / strongly agreed that OTTBs have a bad reputation. Participants were divided over whether OTTBs have more physical issues compared to other horses. Over one third of respondents (35.76%) believed that OTTBs display more stereotypical behaviours compared to other horses. For the British racing only 4% of respondents agreed that the British racing industry and equestrian industry collaborate enough to provide outlets for OTTBs, 46.5% considered that efforts are adequate but more could be done, while 29.6% felt that not enough was done. Similarly, 37.7% of respondents felt that insufficient information was provided by the industry about sourcing an OTTB. This study provides evidence that can be used by the TB industry and equestrian stakeholders to develop strategies to improve utility of OTTBs in a second career.

Lay person message: There is international public concern regarding Thoroughbred (TB) racehorses' lives after racing. This mixed methods study explored the perceptions of equestrian stakeholders regarding off the track retired TB racehorses (OTTBs) in a second ridden career and barriers that exist. Both qualitative and quantitative data was obtained on various topics related to the OTTB in a second career. This study provides evidence that can be used by the TB industry and equestrian stakeholders to develop strategies to improve utility of OTTBs in a second career.

Keywords: Thoroughbred, racehorse, equestrian, racing, retired, horse

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RP24

OBSERVATIONAL INDICATORS OF FATIGUE DURING THE CROSS COUNTRY PHASE OF EVENTING

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Research identifying risk factors for horse falls, refusals and run outs during the cross-country (XC) phase of eventing has been conducted, however the impact of fatigue on horse and rider welfare have received little attention. This study explored if observation of horse/rider behaviours could provide visible indicators of fatigue in the event horse which could be used to inform rider or officials decision-making. Two experienced equestrian researchers reviewed 10 randomly selected clips of XC footage taken from sections of the course between jumps during a UK novice event to develop an ethogram. Notational analysis of video clips (~5s duration) taken near the start, middle and end of the course (n=280 video clips) of horse and rider combinations were reviewed by a trained observer, at 0.5 speed to facilitate review in random order. For the horse, rhythm: steady/slightly, moderately or highly variable, carriage: uphill/neutral/on forehand, tail carriage: normal/high/low, tail carriage: normal/high/low, ear position: forward, slightly back, flicking, mouth: closed/open/open and closing, head and neck position (HNP): on, behind or in front of the vertical/elevated, high, low and overall impression if the horse was relaxed or tense were scored?. Additionally, any deviation of the horse from the riding line and evidence of rider imbalance were noted. Differences in the frequency of behaviours were evaluated using Friedmans analyses with *post-hoc* Wilcoxon Signed-rank tests (Significance: $p \leq 0.05$). Ten factors differed significantly across the course ($p \leq 0.05$); *post-hoc* tests found no differences between the start-middle-end for horse/rider harmony, tail carriage, mouth or ear position. Horses' rhythm ($p=0.03$) was more variable from end>start. "Tension" increased from start>middle ($p=0.02$) but reduced from middle>end ($p=0.02$). Rider balance deteriorated ($p=0.02$) from start>middle; increased signs of moderate/severe fatigue were observed from the middle>start ($p=0.03$). Horses' HNP were more often neutral/low in the middle compared to the start ($p=0.007$) but more often raised/neutral from the middle>end ($p<0.001$). Increased ear movement was observed between the start>middle ($p=0.05$). Identification of repeatable and objective signs of fatigue on course in the event horse could aid riders', trainers', veterinary commission and competition stewards' decision-making as to whether a horse is fit to continue and therefore safeguard equine safety and welfare, ensuring a good life when eventing.

Lay person message: Horse welfare in sport is being increasingly questioned by the public. We observed videos of event horses galloping between jumps at the start, middle and end of XC rounds to assess horse/rider behaviours that could indicate fatigue. Changes in horses' ears, HNP and rider balance were observed in the middle of the course with horses' rhythm more varied at the end compared to the start; these observations may be useful to explore further as potential visible, measurable markers of fatigue in event horses.

Keywords: Sport horse welfare, eventing, horse trials, fatigue, Social Licence to Operate

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GLOSSARY

Aid: Any of the signals used to elicit responses in horses. Rein, leg, whip and spur aids are initially learned through negative reinforcement and then transformed to light aids (light rein, light leg, voice, seat) via classical conditioning. The difference between cues and aids is that aids may vary in intensity, whereas cues are typically of the same intensity. Traditionally, the aids are divided into two groups: natural aids and artificial aids. This distinction is misleading as it refers to what is 'naturally' available to the rider, but it neither identifies nor correlates with the two learning modalities through which the horse acquires its responses to the aids.

Approach conditioning: An operant conditioning technique that reduces flight behaviours using the natural tendency of horses to investigate and approach unknown objects, in combination with systematic desensitisation. The horse is encouraged to approach the object that it is fearful of, which then retreats as the horse approaches. The horse may then be signalled to stop before it reaches its fear threshold, so that the object retreats even further. The horse is then signalled to catch up. As soon as the horse slows its approach it is deliberately stopped, and this is repeated until the horse comes as close as possible to the object. The horse usually becomes increasingly motivated to investigate the object.

Blocking: A form of interference with classical conditioning; once an animal has learned that a given stimulus predicts a certain event the animal may fail to learn new associations, i.e. a second stimulus may not become a conditional stimulus because learning has been blocked by the presence of the first conditional stimulus.

Classical conditioning: The process whereby an animal learns to correlate external events, e.g. the animal is presented to a neutral stimulus (e.g. a sound) which is followed by a biologically important stimulus (e.g. a noxious stimulus such as a shock, or a positive stimulus such as food). In equitation, classical conditioning is the process where learned responses are elicited from more subtle versions of the same signal or to entirely new signals, e.g. when a horse learns to react to voice commands, visual cues, or rider seat cues.

Cognition: The mechanisms by which animals acquire, process, store and act on information from the environment. The study of cognition covers many topics such as perception, learning, memory and communication.

Conflict behaviour: Stress-induced behavioural changes that arise from conflicting motivations, especially when avoidance reactions are prevented. Conflict behaviour may be agonistic behaviours, redirected aggression or displacement activities. If the stressor is recurrent, conflict behaviour may manifest as repetition and ritualisation of original conflict behaviours. Stereotypies and self-mutilation may develop from severe, chronic, or frequent stressors. In equitation, conflict behaviours may be caused by application of simultaneous opposing signals (such as go and stop/slow) such that the horse is unable to offer any learned responses sufficiently and is forced to endure discomfort from relentless rein and leg pressures. Similarly, conflict behaviour may result from incorrect negative reinforcement, such as the reinforcement of inconsistent responses or lack of removal of pressure.

Contact: The connection of the rider's hands to the horse's mouth, of the legs to the horse's sides and of the seat to the horse's back via the saddle. The topic of contact with both hand and leg generates considerable controversy relating to the pressure that the horse should endure. In classical equitation, contact with the rein and rider's leg involves a light pressure (approximately 200g) to the horse's lips/tongue and body, respectively. A heavy contact may cause progressive habituation leading to diminished reactions to rein and leg signals as a result of incorrect negative reinforcement and/or simultaneous application of the aids.

Counter-conditioning: A type of training based on the principles of classical conditioning that attempts to replace fear responses to a stimulus with more desirable responses. The term means training an animal to show a behaviour which is opposite or different to the one the trainer wishes to eliminate. The technique is widely used

in combination with systematic desensitisation. By ensuring that the preferred behaviour is more rewarding, the animal learns to perform the new behaviour when exposed to the problematic stimulus.

Cue: An event that elicits a learned response.

Ethogram: A list of the type of behaviours performed by a species in a particular environment. The list includes precise descriptions of each behaviour. It is fundamental to any study of animal behaviour to define which behaviour types are being observed and recorded.

Ethology: The scientific and objective study of animal behaviour, usually with a focus on behaviour under natural conditions, and viewing behaviour as an evolutionarily adaptive trait.

Extinction: The disappearance of a previously learned behaviour when the behaviour is no longer reinforced. Extinction can occur in all types of behavioural conditioning, but it is most often associated with operant conditioning. When implemented consistently over time, extinction results in the eventual decrease of the undesired behaviour, but in the short-term the animal may exhibit an extinction burst.

Extinction burst: A sudden and temporary increase in the frequency or magnitude of a behaviour, followed by the eventual decline and extinction of the behaviour targeted for elimination. Extinction bursts are more likely to occur when the extinction procedure is in the early stages.

FEI Fédération Equestre Internationale: The world governing body for Jumping, Dressage & Para Dressage, Eventing, Driving & Para Driving, Endurance and Vaulting.

Flooding (response prevention): A behaviour modification technique where the animal is exposed to an overwhelming amount of the fear-eliciting stimulus for a prolonged period of time while avoidance responses are prevented, until the animal's apparent resistance ceases. The method is generally not recommended because there are severe risks associated with the method, e.g. injuries due to exaggerated fear reactions.

Foundation training: The basic training of a young horse to respond to aids and cues that control its gait, tempo, direction and posture for whatever purpose may be required. Foundation training may also include habituation to saddle and rider.

Freeze: The sudden alert motionless stance associated with a highly attentive reaction to an external stimulus.

Habituation: The waning of a response to a repeated stimulus that is not caused by fatigue or sensory adaptation. Habituation techniques include systematic desensitisation, counter- conditioning, over-shadowing, stimulus blending and approach conditioning.

Hard/tough-mouthed: Describes horses that have habituated to rein pressure. This is generally a result of incorrect negative reinforcement and can result in learned helplessness and conflict behaviours.

HPA axis (Hypothalamic–Pituitary–Adrenal axis): An organ system comprising the hypothalamus, the pituitary gland and the adrenal gland. The activation of the HPA axis is heightened when an animal is challenged with a stressor, and HPA axis products, such as cortisol, can serve as a physiological indicator of stress in animals.

Hyper-reactive behaviour: Behaviours characteristic of an activated HPA axis and associated with various levels of arousal. Such behaviours typically involve the horse having a hollow posture and leg movements with increased activity and tempo, yet shorter strides. Hyper-reactive behaviours are quickly learned and resistant to extinction because of their adaptiveness in the equid ethogram. Behavioural evidence of hyper-reactivity ranges from postural tonus to responses such as shying, bolting, bucking and rearing.

Learned helplessness: A state in which an animal has learned not to respond to pressure or pain. It arises from prolonged exposure to aversive situations or insufficient environments without the possibility of avoidance or control. It may occur from inappropriate application of negative reinforcement or positive punishment, which results in the horse being unable to obtain release from or avoid the aversive stimuli. If this continues over a period of time the horse will no longer make responses that were once appropriate, even if they would be appropriate under the present conditions.

Negative punishment (subtraction punishment): The removal of something pleasant (such as food) to punish an undesired response and thus decrease the probability of that response.

Negative reinforcement (subtraction reinforcement): The removal of something aversive (such as pressure) to reward a desired response and thus increase the probability of that response.

Operant conditioning (instrumental conditioning): The process whereby an animal learns from the consequences of its responses, i.e. through positive or negative reinforcement (which will increase the likelihood of a behaviour), or through positive or negative punishment (which will decrease the likelihood of a behaviour).

Overshadowing: The effect of two signals of different intensity being applied simultaneously, such that only the most intense/relevant will result in a learned response. It can explain why animals sometimes fail to associate the intended cue with the desired behaviour in favour of a different stimulus that was happening unintentionally at the same time and which was more relevant to the animal. The term overshadowing also denotes a desensitisation technique where habituation to a stimulus is facilitated by the simultaneous presentation of two stimuli that elicit a withdrawal response (such as lead rein cues/pressure and clippers or a needle).

Positive punishment (addition punishment): The addition of something unpleasant to punish an undesired response and thus decrease the probability of that response. Incorrect use of positive punishment can lower an animal's motivation to trial new responses, desensitise the animal to the punishing stimulus and create fearful associations.

Positive reinforcement (addition reinforcement): The addition of something pleasant (such as food or a pleasant scratch) to reward a desired response and thus increase the probability of that response.

Punishment: The process in which a punisher follows a particular behaviour so that the frequency (or probability) of that behaviour decreases. See also Positive punishment and Negative punishment.

Reinforcement: The process in which a reinforcer follows a particular behaviour so that the frequency (or probability) of that behaviour increases. See also Positive reinforcement and Negative reinforcement.

Reinforcement schedule: The frequency of the reinforcers used in training. The schedule may be continuous, intermittent or declining.

Reinforcer: An environmental change that increases the likelihood that an animal will make a particular response, i.e. a reward (positive reinforcer) or removal of an aversive stimulus (negative reinforcer).

- *Primary reinforcer*: A stimulus that is considered naturally rewarding (e.g. food).
- *Secondary reinforcer*: A stimulus that has become associated with a rewarding stimulus and thus has been conditioned to be rewarding for the horse (e.g. the sound of a clicker which has been associated with a food reward).

Shaping: The successive approximation of a behaviour toward a targeted desirable behaviour through the consecutive training of one single quality of a response followed by the next.

Social Licence to Operate: The ongoing acceptance of an entity's practices.

Stereotypy: A repeated, relatively invariant sequence of movements that has no function obvious to the observer. Stereotypies are abnormal behaviours and are generally considered as a sign of impaired welfare. Stereotypic behaviour arises from frequent or chronic stress and may help the animal to cope with adverse conditions. The behaviours may persist even if the triggering factors are eliminated. A number of stereotypic behaviours, such as box-wandering, pacing and crib-biting are seen in horses and are erroneously referred to as stable vices.

Stimulus blending: A desensitisation technique that uses a closely resembling stimulus, to which the horse is already habituated, to systematically desensitise the horse to the fear-inducing stimulus. The fear-inducing stimulus is applied simultaneously with the known, non-fear-inducing stimulus, and then systematically increased in intensity. The aural and tactile characteristics of the two stimuli are gradually mixed, making identification of the new one difficult and different. The old benign stimulus can then be diminished and finally terminated after which the horse will show habituation also to the new stimulus.

Stimulus control: The process by which a response becomes consistently elicited by a light aid or cue.

Stress: Stress is a state which is characterised by the behavioural and physiological responses elicited when an individual perceives a threat to its homeostasis ('internal balance'). The threat is termed a stressor.

Stressor: Anything that disrupts homeostasis, e.g. physical and psychological threats incl. lack of fulfilment of natural behavioural needs. Stressors appear to be stressful to the extent they contain elements of loss of control, loss of predictability, and absence of outlets for frustration.

Stress response: The body's adaptations evolved to re-establish homeostasis. Stress responses are elicited when an animal anticipates or faces a stressor and involves a range of endocrine and neural systems. The responses are somewhat non-specific to the type of stressors that trigger them. Stress responses are in nature adaptive; however, when these responses are provoked for a long duration or repeatedly, they can cause negative effects such as increased susceptibility for diseases, gastric ulceration, abnormal behaviour, reproduction problems and reduced performance.

Systematic desensitisation: Systematic desensitisation is a commonly used behaviour modification technique for the alleviation of behaviour problems caused by inappropriate arousal. In a controlled situation, the animal is exposed to low levels of the arousing stimulus according to an increasing gradient, until habituation occurs. An increase in the level of the stimulus is not made until the animal reliably fails to react to the previous level. In this way, the technique aims to raise the threshold for a response. The decrease in arousal can be reinforced by either negative or positive reinforcement.

A QUICK GUIDE TO STATISTICS FOR NON-SCIENTISTS

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The 'scientific process' comprises the six steps listed below. The application of statistics is a tool which enables reliable conclusions to be reached and the research objective to be answered. Statistical analysis is not that difficult and simply involves following a series of simple steps and rules. An example is used to demonstrate the steps required for a simple scenario where the researcher needs to apply the two sample t test in order to statistically assess the difference between two sets of data. (All text relating to the example given is highlighted with grey shading.)

EXAMPLE: A study is planned to investigate the success of dressage horses trained using two different training methods (Method A and Method B).

1. Generating a research question

A good project will have a simple title which clearly describes the objective of the study.

Is there a difference in the success of dressage horses trained using Method A and Method B?

2. Identifying variables and measures

There are two types of variables – independent variables which are determined by the researcher and dependent variables which provide the measurements upon which statistical tests are conducted.

The Independent Variable is 'Training method' and has two levels:

3. Formulating hypotheses

All research projects rely on the examination of hypotheses. Each statistical analysis relies on the simultaneous examination of a pair of hypotheses which are opposites of each other and always follow the standard format:

- The Null Hypothesis (Ho) states that *'There is no significant difference between A and B'*.
- The Alternative Hypothesis (Ha/H1) states that '*There is a significant difference between A and B*'.

Ho: There is no significant difference in the dressage scores achieved by horses trained using Method A and the dressage scores achieved by horses trained using Method B.
Ha: There is significant difference in the dressage scores achieved by horses trained using Method A and the dressage scores achieved by horses trained using Method B.

4. Designing the experiment ~ data collection

When designing an experiment it is important to obtain a decent sample size (n, as a rough guide is that anything less than 30 is considered to be a 'small' sample) and to match everything about the individuals contributing to each sample as evenly as possible.

All of the horse and rider combinations in this study will be competing at a similar level, and performing the same dressage test, under the same conditions.

Sample data (Dressage scores, %)	
Method A	60 60 60 50 64 56 55 56 48 44 53 53 59 54 57 52 52 59 56 61 55 50 58 56 52 62 53 67 58 51
Method B	60 73 69 67 72 67 65 64 64 72 64 72 61 68 70 74 61 63 66 68 66 72 70 68 55 87 60 66 68 69 183

Two types of data analysis are applied: first, exploratory, descriptive analysis which provides averages and an indication of the spread of the data; and second, confirmatory statistical analysis which yields 'test statistics' and probabilities and ultimately allows a statistical conclusion to be reached. The latter will then allow a conclusion to be reached in relation to the objective of the study.

Exploratory, descriptive analysis of the sample data shows that horses trained using Method A achieve an average score of 55.7% with a variability of 4.93% typically presented as 55.7±4.93%. Horses trained using Method B achieved a higher score of 67.4±5.80%.

At this point the general impression is gained that there is a difference in the scores achieved by horses trained using the two different training methods.

Confirmatory, statistical analysis is necessary in order to reach a reliable conclusion. A standard process is now followed:

- Conduct a statistical test (here the two sample t test). This will produce a test statistic and a probability value, P.

6. Reach a conclusion

In statistics there is a one important number: **P=0.05**.

A P value of 0.05 means that if a study was repeated 100 times then 95 times out of 100 the same result would be found, and 5 times out of 100 the opposite result would be gained. As far as interpretation of results goes, the P value should be less than 0.05 in order for the results to be considered to be reliable.

In order to reach a statistically sound conclusion, a simple procedure is followed to relate the P value to the hypotheses:

- If the P value obtained is less than 0.05, the Ha is accepted and the Ho is not accepted. The conclusion is then reached that there is a significant difference between the two samples. The averages found in exploratory data analysis show that training Method B is more successful than Method A.

- If the P value obtained is equal to, or greater than, 0.05, the Ho is accepted and the Ha is rejected. The conclusion is then reached that there is not a significant difference between the two samples. (Here scientists state that there is a non-significant difference.)

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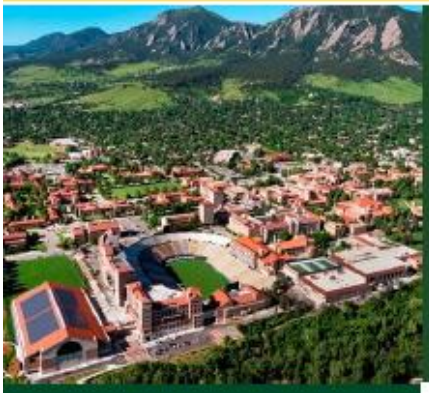

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