

Equine welfare

balancing tradition and science

The horse has been human companion, worker, performer, competitor and means of transport since ancient times. These diverse roles have many different implications for horse welfare, from the pressure for excellence in the competitive horse to the disposal of 'unwanted' feral horses. Equine husbandry is steeped in tradition and myth, but with the input of science and new technologies, many traditional practices are now being re-examined and the treatment of horses generally is coming under closer scrutiny.

The 2002 RSPCA Scientific Seminar, Equine welfare: balancing tradition and science, focussed on four areas of concern for the welfare of the horse – (1) the demands of performance and competition, (2) the cost of neglect and inexperience, (3) re-assessing traditional practices in horse management, and (4) dealing with the unwanted horse.

A group of experts in equine health and welfare were assembled from Australia and overseas to address these issues. The Seminar was chaired by Professor Ivan Caple of the University of Melbourne and opened by the President of RSPCA Australia, Dr Hugh Wirth.

Programme

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Introduction from the Chair - Equine welfare: balancing tradition and science

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In a Chinese year of the horse, the title “*Equine Welfare – balancing tradition and science*” is appropriate for the 2002 RSPCA Australia Scientific Seminar. Australia’s tradition with horses commenced with the arrival of the first fleet in 1788. Amongst the livestock cargo was one stallion, three mares, a colt and two fillies that had been loaded at the Cape of Good Hope. These were the first horses on this continent. During the first 150 years of Australia’s settlement over 5,200 pure-bred horses were imported, mainly from Britain, to improve the quality of the horse population. Many of our traditions with regards to horse husbandry and welfare were imported from Britain, and later modified by science as the horse contributed to the development of Australia.

Australia’s disease-free status provided an early opportunity to develop a live export trade in horses to India from 1834 when the disease African horse sickness in South Africa meant that horses from that country were unsuitable for use by the army. This live export trade of horses lasted for 100 years. During World War I, about 300,000 soldiers left Australia to fight overseas and 121,000 horses were exported. The demand for horses decreased in the 1930’s, and many horses in central and northern Australia were left to range freely. It is estimated that there is now a population of about 300,000 feral horses to be controlled by harvesting to prevent environmental degradation. There is a Model code for the Land Transport of Horses that was approved by ARMCANZ in 1997, principally to regulate the harvesting process, and the horse is protected under the Prevention of Cruelty to Animals Legislation in all Australian jurisdictions. At the start of the 21st century there are about 1.2 million horses used for racing, equestrian sports, and recreation – 80,000 horses are used in pony club activities.

What is the expectation of Australian society for the welfare of the horse in the 21st century? Most Australians have a view on equine welfare. But only a small proportion of the population has the opportunity to acquire, experience, and understand some of the traditions associated with owning and handling horses by having a direct involvement with them from an early age, such as having to ride a pony to primary school, having the opportunity to join a pony club or, later, having the enthusiasm to attend an adult riding school when the children have left home.

The horse industry is a diverse one with many special interest groups and disciplines having different cultures. The website <http://www.horsedirectory.com.au> provides a directory of organizations and people with varied interests in horses in Australia. This diverse nature of the horse industry probably means that any animal welfare plans may have to rely on enforcement of legislation and supporting codes for some time to come. The horse industry would not seem to be ready to introduce a continuous improvement model to improve horse welfare outcomes through self-regulation with the introduction of quality assurance, compliance audits and benchmarking.

This 2002 RSPCA Australia Scientific Seminar focuses on four areas of concern for the welfare of the horse – (1) the demands of performance and competition, (2) the cost of neglect and inexperience (on the part of the horse and the owner), (3) re-assessing traditional practices in horse management, and (4) dealing with the unwanted horse. Since 1995, the Rural Industries Research and Development Corporation (RIRDC) has sponsored an equine research program. Professor Reuben Rose has been the inaugural Research Manager of the program. The current (2001-2006) RIRDC research plan mentions “*Ensuring the welfare of the horse by developing better ways of treating and dealing with important problems is critical if industry is to maintain public credibility*”. Should we expect science to simply develop crisis management strategies to deal with problems as they occur with traditional horse management practices, or should we expect scientific research to provide a sustained improvement in equine welfare in the 21st century? These and other questions will be debated in this year’s Scientific Seminar.

The contribution of equine science to horse welfare

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In Australia, there are about 1.2 million horses used for racing, equestrian sports, recreation and for meat products. The thoroughbred racing sector alone has an annual turnover of \$15 billion per annum. The Equestrian Federation has 500 registered clubs, 13,800 members and 28,500 registered horses. Sixty thousand young Australians are members of pony clubs. More than one million horses are kept on Australian farms and those in metropolitan areas provide a major demand for livestock feed. These brief statistics indicate the significance of industry and community involvement.

The Rural Industries Research and Development Corporation (RIRDC) is a semi-government R&D corporation which manages R&D projects supported by industry funds for a range of groups and these industry funds are matched dollar for dollar by the Australian government. In 1995, an Equine R&D program commenced under the auspices of RIRDC, with the appointment of a committee which included scientists with expertise in research and those with knowledge and expertise in various sectors of the horse industry. The program commenced with about 85% of its financial support from a registration fee on racehorses with the support of the Australian Racing Board, which generated about \$280,000 per annum. Another \$75,000 per annum from a variety of horse industry groups including: the Australian Harness Racing Council, the Equestrian Federation of Australia, the Australian Stock Horse Society, the Australian Quarter Horse Association, the Australian Equine Veterinary Association, the NSW Thoroughbred Breeders Club and some private individuals. With the dollar for dollar matching by the government, this has enabled a total annual program of about \$700,000. The Committee has worked closely with the Australian Horse Industry Council in promoting the Equine R&D Program and in defining the R&D needs of the horse industry.

From the outset of the program, it was recognised that horse welfare was a key issue for the industry and most of the projects supported have had significant welfare implications. Supporting better nutrition, finding more effective treatments for painful conditions such as laminitis, more effective treatments for respiratory disease and defining risk factors for limb injuries in horses are all projects where there are significant welfare outcomes. One of the key areas of the R&D program is ensuring that the results of research that will have clear welfare benefits to the horse are communicated to the horse industry. The communication program has involved a number of major projects:

1. A survey of the research needs of the horse industry, involving more 3500 questionnaires distributed to all the major horse groups throughout Australia, following initial interviews with focus groups.
2. A major workshop involving researchers and horse industry personnel to identify the R&D priorities for the horse industry.
3. Preparation of a 5 year strategic plan (now in its second five years) for the horse industry, which was circulated to all national horse associations for comment and also to the major international research funding bodies.
4. Development of a quarterly newsletter and an internet web site (<http://www.usyd.edu.au/su/rirdc>) to communicate the results of the R&D program to the horse industry.
5. Annual review of the program strategies with the major horse industry groups.

From extensive consultation with the industry and feedback on the five year plan, the focus of the R&D program has been to:

- Ensure the health and welfare of the horse
- Assist the industry to be more profitable and reduce the current level of wastage
- Encourage the export potential of the industry
- Promote the sustainable use of land and water resources
- Enhance the skills, knowledge and capability of people in the industry

The RIRDC program has recognised that ensuring the welfare of the horse is a key priority in all projects funded. Developing better ways of managing and treating major horse problems is a key strategy to achieve welfare benefits for horses.

Addressing the demands of performance and competition through science

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The demands made on performance horses vary greatly. Racehorses are generally required to compete at maximal speeds for 1-3 minutes, while endurance horses compete at slow speeds over many kilometers. Most Thoroughbred and Standardbred races occur on circular tracks, with horses required to travel at 50-60 kilometres per hour. Competition at these speeds results in very high metabolic rates, and high impact forces on the limbs. It is not surprising that injuries are common in racehorses, and lameness is the most common health problem and cause of wastage. In endurance horses, the challenges to health and welfare are mostly related to disturbances to body temperature, body fluids and electrolytes. Endurance and high speed gallops and jumping are performed by event horses.

The welfare of the horse is promoted by scientific study of injuries and the factors that contribute to injuries, coupled with transfer of knowledge to industry participants. Studies of lameness in racing stables necessitate collection of records from many horses over 1-2 years. Detailed records of injuries sustained during training and racing are fundamental to the process of investigating the causes of the problems. They also enable evaluation of the effects of interventions designed to reduce lameness, including changes to racetrack design and reconstruction, surfaces used for exercise training, training routines and racing schedules.

Recent studies have emphasized the importance of improved racetrack design as an important factor in promotion of the welfare of the racehorse. The welfare of racehorses is also promoted if the exercise training results in appropriate adaptation of the body systems that are recruited during racing. Undertraining compromises welfare because underprepared horses are more likely to develop premature fatigue during the race. Fatigue is likely to increase lameness rates because it increases the strain on the limbs. It will also increase the likelihood of mistakes over jumps. Recent studies have demonstrated that the usual 8-10 weeks of preparation of a racehorse for its first race is probably inadequate. Fitness for racing can be promoted by training at appropriate intensities for 4-6 months.

Overtraining also compromises welfare and performance. Regular monitoring of body weight is the best way to detect early signs of overtraining. Scientific methods can promote horse welfare by refining training in order to maximise fitness. They can also improve the efficiency of the training process. Measurements of heart rate during exercise and blood lactate concentrations after exercise are simple methods of measuring the intensity of exercise and designing efficient training programs. Unfortunately there has been little adoption of these techniques. Routine resting haematology and plasma biochemistry are commonly used in racehorses, but these parameters do not enable evaluation of fitness or diagnosis of overtraining. Increased use of standardised fitness tests could promote horse welfare by identifying horses with limited potential or subclinical disease. These tests also quantify the effects of training and rest periods on fitness.

In conclusion, science has promoted the welfare of the racehorse by contributing to knowledge on injury rates and the causes of injuries. Scientific techniques are also now available for refining exercise training and fitness testing in racehorses.

Welfare issues relating to the racing of 2-year-old thoroughbreds

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Racing horses as two-year-olds is a contentious issue with concern being raised about the possible detrimental long-term effects of racing what are perceived by many to be relatively immature horses. Over the past 30 years a number of studies have been undertaken to investigate the effects on horses first racing as a two-year-olds compared to those who begin racing when older.

Much of the earliest information was gathered in the UK, where the premiums on two-year-old racing are not as high as those in Australia. Therefore, much of the information provided in this presentation will be based on studies conducted in Australia in the 1980's and 1990's.

There have been two major studies conducted in Australia investigating the effects of age at first start and gender on the racing careers of Thoroughbred horses. One of the major findings of these studies showed that horses which raced as two-year-olds had, on average, more career starts and raced for a greater number of seasons than those beginning their racing careers as three-, four or five-year olds.

In a study investigating the careers of 553 Thoroughbred yearlings catalogued for the 1991 Easter yearling sale in Sydney it was found that 85.4% went on to race. Of these 50% raced as two-year-olds, with ~ 80% of the yearling crop having raced by the end of the three-year-old season. Foals born earlier in the season were not more likely to race sooner than those born late in the season. Gender had no effect on the time to first start. Those beginning their racing careers earlier in life had longer racing careers when compared to those having their first start when older. On average horses racing at two years had an average of 3 (range 1-14 starts) starts with those racing at three years averaging 6 starts (range 1-21 starts). Colts and geldings had longer racing careers than fillies with many of the latter group being retired earlier to stud.

In summary, the findings of this study indicate that there is no apparent detrimental effect on career length in horses first racing as two-year-olds compared to those beginning their careers when older.

Cruelty to horses- the work of the RSPCA

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This paper will describe the definitions of cruelty, taking into account the aspects of physical acts as opposed to acts of omission. Furthermore, the paper will expand upon the relationship between prevention, perception and community expectations of the RSPCA.

Animal welfare takes many forms, including the varying perceptions of equine welfare. What must be considered is the difference between what issues are known, as opposed to what facts can be proved. So often is the case that animal welfare agencies including the RSPCA are taken to task over what is perceived to be an element of either intuitive intervention or industry acceptance contrary to the wishes of a minority.

It is the responsibility of the RSPCA and indeed other statutory animal welfare organisations to take into account the real issues that can make a difference without jeopardising the aims of the Society and compromising welfare standards. This is of paramount importance when the RSPCA tackles matters of equine welfare both from a pet owner's perspective to that of industry standards and practices from a position of independence.

There are varying degrees of education, prevention and enforcement measures that are undertaken by the various Societies. Perhaps the success of the RSPCA can be largely attributed to the premise that the organisation takes a balanced and objective view to the needs and the expectations of both the animals and the community at large.

Equine welfare is often compromised when it falls victim to ignorance, imbalanced industry expectations and passion/obsession. This paper will outline the various offences specific to equine welfare and provide examples of how to combat those salient points. A display of photographs will be presented to further explain the reasons as to why welfare organisations play such a vital role in the improvement of animal welfare generally, be it lobbying the government or informing the general public by means of education and information dissemination with an emphasis on one of the most significant icons of Australia, equine welfare.

Welfare issues relating to the ownership of the hobby horse

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Horse ownership in Australia is much more affordable than in many other countries, meaning that horse ownership can be enjoyed by many. Unfortunately this is associated with many instances of horse neglect usually due to ignorance rather than cruelty. Many single horse owners purchase a horse without having a full appreciation of the requirements of horse care. They have little ability to recognise whether the horse is receiving too much or too little feed and do not have the knowledge or experience to be able to meet the requirements of the horse even if they could recognise the need.

While many owners are aware that horses require worming they have little understanding of how often and what to use. The need for regular hoof maintenance is similar but many are not aware that horses also require regular dental inspections and vaccinations. They do not have the ability to recognise illness and often sick or injured horses do not receive expert treatment until it is too late. Other areas for concern include transport and facilities. Luckily these types of horse owners tend to be in the minority and most 'hobby' horses are cared for extremely well.

Unfortunately the type of person likely to neglect their horse is not usually the type that will actively seek out information on how to deal with it properly. Those that do seek advice are often not aware of where to gain accurate information. Sources of information include neighbours, farriers, feed merchants and feed manufacturers, veterinarians and various written sources. Obviously the reliability and accuracy of these different sources of information vary greatly.

People that take greater care of their horses tend to be those that belong to some sort of horse organisation such as Pony Clubs, sporting organisations and breed societies and therefore have greater access to information.

Riding schools and trail riding establishments are also often subject to inspections for reported cases of horse neglect or abuse. While these types of establishments do not strictly fall into the 'hobby' category as they are run as business they are often run by people with limited horse experience who see the horse as a money making machine. Again, the very badly run places tend to be in the minority, however, they are serious cause for concern. Horses tend to be overworked, underfed and do not receive regular veterinary care. It is often cheaper to simply get rid of a poor, injured or unwell horse and buy another, than it is to look after the horse properly. Another characteristic of the poorly run establishment is poor record keeping and rapid turnover of staff both of which only exacerbate the problems.

This presentation will cover in greater detail some of the welfare issues associated with the management of the 'hobby' horse and will include some suggestions for improving the care of these types of horses and of those in riding schools and trail riding establishments.

Housing and management of the stabled horse

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Horses are housed under a variety of different systems. The four broad categories of housing for horses include:

- (a) walk-in shelters in paddocks;
- (b) standing stalls;
- (c) loose boxes; and
- (d) barns. (Clarke, 1994)

Each approach offers certain benefits and challenges in relation to the health and welfare of horses.

One widely accepted approach to evaluate the welfare of housed or contained animals focuses on the provision of the five freedoms:

- (a) freedom from hunger, thirst and malnutrition;
- (b) freedom from physical and thermal discomfort;
- (c) freedom from pain, injury and disease;
- (d) freedom from fear and distress;
- (e) freedom to express most normal patterns of behaviour. (Farm Animal Welfare Council, 1992).

There are unique challenges associated with the housing of horses especially in comparison to other species. It is possible to extrapolate some principles from the housing of farm animal species, however, this is not always the case. The athletic performance of horses can be hampered by minor levels of respiratory disease. Horses are also long lived compared with other farm animals. Debilitating conditions such as allergic respiratory disease are primarily seen in older horses ranging from a child's pony to the most valuable blood stock.

Horses are also kept at a much lower stocking density than other intensively housed livestock. The stocking density of the latter group of animals is one of the primary factors that affects the quality of air these animals breath. By comparison, the quality of the air horses breath is primarily affected by the design of the building and the types and quality of feed and bedding provided.

Horses evolved as a herd based species grazing freely on open plains with flight as the basic defence from predators. (Mills & Nankervis, 1999). Shelter, grazing, shade and water have been identified as primary needs for the free roaming horse. (Tyler, 1972). However, all of the above is often overshadowed with emphasis placed on cost-effective owner/handler centred considerations with modern housing practices which can impact on the health and welfare of the horses. While there is still a lot to be learnt there are approaches which can be taken to improve the health and welfare of the stabled horse. These can also impact positively in the horses athletic performance and long-term longevity and productivity.

The Five Freedoms

(a) Freedom from thirst, hunger and malnutrition

Ad lib water and the provision of a balanced diet with sufficient roughage are essential first steps. Frequency as well as quality of meals is also important. However, too many small meals may be just as much of a problem as fewer larger meals. McGreevy et al (1995) reported that feeding of forage more than three times a day was associated with a greater risk of behavioural problems than with less frequent feeding. In group housing management systems there should be multiple feed and watering locations so that less dominant individuals are not kept away from feed and water by more dominant individuals.

(b) Freedom from physical and thermal discomfort

Adult horses have a wide temperature tolerance and a well fed healthy horse wearing an insulated rug is unlikely to suffer from "drafts" or chilling (Clarke, 1987). However, the same cannot be said for an unwell weak new born foal. Quartz halogen heaters offer a practical source of heat for this situation.

(c) *Freedom from pain, injury and disease*

Respiratory health is arguably the major health concern for the stabled horse (Clarke, 1994). The quality of the air horses breath (and their respiratory health) is affected by

- (i) the ventilation of the stable;
- (ii) the quality of the feed and bedding in use; and
- (iii) the management system of the bedding.

A well ventilated stable will decrease a horse's exposure to a wide range of pathogens including bacteria, viruses, noxious gases and dusts (Clarke, 1994). Ventilation can also help to prevent dampness in the stable and to decrease the risk of plant based bedding materials moulding in sites. The majority of stables and barns can be effectively ventilated using the three natural forces of ventilation, namely the stack effect, perflation and aspiration (Clarke, 1994). However, a horse eating mouldy hay in the best ventilated stable will still inhale dangerous numbers of spores so that ventilation alone is not the answer to maintaining the respiratory health of the stabled horse.

There has been considerable research carried out which shows that traditionally made hay and straw are the major sources of the most harmful dust which horses breath (Raymond & Clarke, 1997). The primary component of this dust is mould spores. There are alternatives to dry hay which includes soaking hay and the use of hay lage products (Raymond et. al. 1997). There are also alternatives to straw such as shredded paper and wood shavings (Curtis et al 1996). However, if deep litter management systems are used there can be serious moulding of these materials as well as a build up of harmful ammonia (Curtis et al 1996).

It should also be noted that horses have been shown to have a preference for straw as a bedding over wood shavings and both of these were preferred over paper bedding (Mills et al 2000). So while straw is associated with fewer behavioural problems it is associated with an increased risk of respiratory disease (McGreevy et al 1995).

This freedom also highlights the need to avoid design features and management practices which increase the risk of injury. One very important consideration on this point relates to the most common fracture of young foals. This is sesamoid bone fracture and often has consequences for the rest of the horse's life. This occurs when young or immature foals run to exhaustion chasing their mothers or older foals. Foals at risk should be kept in small paddocks with their mothers. It is also important to avoid placing older stronger foals and their mothers in paddocks with weaker foals (Clarke 1994).

Fire prevention is too often overlooked in the design of equine facilities and the day to day management practices. Thankfully the incidence of stable fires is not high but when they occur horses can suffer horrific burns and smoke inhalation damage if they survive at all. Many of these fires are preventable for example; inappropriately used small electrical appliances such as kettles and heaters have been identified as a major cause of some of the worst stable fires.

(d) *Freedom from fear and distress*

Horses housed in open housing systems may suffer from fear of aggression if they cannot withdraw to a safe distance from an aggressive individual. In individual housing systems distress is most likely to develop from isolation. Horses have been shown to prefer a light environment where they can at least see other horses (Haupt 1988). Isolation has been identified as one cause of stereotypical behaviours including weaving, box walking, cribbing and wind sucking (Nicol 1999). These behaviours are believed to be the consequence of distress for the horses as distinct from the cause of distress. So owners who try to physically restrain horses from performing stereotypical behaviours which they find personally frustrating may be causing added distress to the horse (McBride & Cuddeford, 2001; McBride & Long 2001).

(e) *Freedom to express most normal patterns of behaviour*

This can be a difficult goal to meet not the least because of the difficulty in defining "normal" behaviour. Indeed the term "normal" has several different meanings which do not necessarily relate to the welfare or well-being of the animal (Cooper and Mills, 1997). It is also clear that not all "natural" behaviours of wild horses are beneficial for the welfare of domesticated horses.

The best and most practical approach involves ensuring that the horse's natural behaviour is not unduly inhibited with its domestication and housing. For example horses fed highly concentrated rations without forage tend to have an increased risk of developing abnormal behaviour. The horse in the wild spends many hours foraging and chewing grasses. Providing adequate fibre in the form of hay or haylage and decreasing the speed at which the horse eats this feed by placing it in a hay net with small holes will increase the time horses spend eating in the stables which more closely resembles the horses evolutionary development (Mills, 1999). Feeding practices can also impact on the incidence of colic in stabled horses.

Conclusion

There is much scientific work to do to answer many questions regarding the welfare and well-being of the stabled horse. On balance we know more regarding the physical requirements of the horse than meeting its behaviour requirements in the domestic situation. However, we must not assume that because the horses physical requirements are met that its welfare and well-being are optimal.

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Stereotypic behaviour in the stabled horse: causes, effects and prevention

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This paper will describe those activities conventionally seen as undesirable responses to the stable environment, their cause and the effectiveness of different approaches to treatment both in terms of reducing the behaviour and improving the horse's quality of life.

Behavioural problems such as weaving or crib-biting have been difficult to solve for horse owners and veterinarians alike. Traditionally undesirable activities such as these have been classed under the broad term of *stable vices* and treatment has centred on prevention of the behaviours *per se* rather than addressing their underlying causes. In contrast, welfare scientists have described such activities as apparently abnormal stereotypies, claiming they are indicative of poor welfare. Stereotypies have been associated with negative emotions such as boredom, frustration or aversion to the stable environment with the claim that prevention of the activities alone can lead to increased distress.

Epidemiological and empirical studies consistently point to an association between equine stereotypies and two management factors in particular, the feeding of low fibre feeds and restrictions on social behaviour. Both differ markedly from the ecological niche for which the horse has evolved and both suggest that stereotypies are a response to behavioural restriction in the stable. There is also evidence that stereotypies can be a conditioned response to rewarding situations in the stable and that early experience can have a significant effect on both the form and likelihood of stereotypy.

To prevent the performance of equine stereotypies, humans have used physically restrictive devices, electric shock and surgery. In many cases these methods are distressing, harmful and ineffective, especially where they address the symptoms rather than the underlying cause.

Developmental and ethological studies have helped to identify new treatments that are based on removing the cause of the stereotypy, improving horses' nutrition and social environment, re-training horses and their owners and redirecting the activities to less harmful forms.

The best strategy for dealing with stereotypic behaviour is to allow appropriate expression of the underlying behaviour, rather than attempting to prevent the stereotypy through control. By feeding high forage rations, providing the minimum amount of concentrate feed to sustain health, and maximising opportunities for social contact, especially around the time of weaning, the emergence of new stereotypies and expression of established ones can be reduced.

Conflict behaviour in the domestic horse and how to avoid it

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Horse training involves the application and subsequent removal of pressure on the horse in order to achieve control. These pressures are applied to varying degrees on the horse's mouth through the action of the bit, and on its sides through the action of the rider's legs. During 'breaking-in', these processes are refined to the extent that the pressures evolve into cues and become light and the responses are repeated to the extent that they become habits. It is within this context that good training or bad training results. This process is operant conditioning, also known as trial and error learning, because the animal 'trials' certain responses in attempting to free itself of pressure. During this important early stage, the release of pressure by the trainer rewards the correct response. The horse learns to stop from pressure on both reins; to go from pressure on his sides by both of the rider's legs; to turn his forelegs from the pressure of a single rein and to turn his hindquarters from the pressure of one of the rider's legs.

However the release of pressure at the wrong time may also reward an incorrect response. Furthermore, there are important conditions surrounding the application of pressures and the aids used to produce the responses. When the horse becomes repeatedly confused by inconsistencies in the rider's (or handler's) messages, stress begins to appear. Under saddle, these outcomes may present as mild levels of stress behaviour such as tension: short choppy strides, raised head carriage, tightened body, clamped tail, teeth grinding, tail swishing or head tossing. If confusions are not attended to, these may escalate to more severe manifestations of conflict such as aggression, shying, rearing, bucking and bolting. Horse people generally refer to such behaviours as 'naughty, dirty, uncooperative' etc. These behaviours are more accurately termed conflict behaviours, and they result when:

- Pressures are not removed at all.
- Pressures are not removed at the appropriate time, ie when the horse gives the required response.
- Pressures are removed inconsistently.
- Two or more opposing pressures are applied simultaneously.
- Flight response behaviours are accidentally incorporated into horse/human interactions.
- The behaviour of the horse, particularly his legs, during horse/human interactions are random and not under 'stimulus control.'
- Riders focus on 'classical' training (using the seat to stop, the position to turn etc) before consolidating pressure-release responses.

In the natural state, animals rarely suffer chronic stress as a result of prolonged conflict behaviour, because they can generally resolve their pain/pressure challenges through fleeing and/or trial and error learning. In domestic horses however, the chronic stress that arises from persistent conflict behaviours, results in more prolonged activation of the HPA axis (Hypothalamic-pituitary-adrenal axis), which raises adrenaline and cortisol levels and causes other physiological changes. Such horses may present as 'stringy' in condition, to be poor 'doers', to suffer frequent gastric disorders and be immunologically suppressed. Further deleterious behaviour changes may develop such as fence walking or self-mutilation, the latter particularly in stallions. These behaviour aberrations can be avoided by clear foundation training and by adhering to some simple principles in training:

- Begin all training sessions in the 'natural outline.'
- Train pressure-release responses consistently, ie maintain or increase pressure until the onset of desired response, then release pressure completely.
- Don't allow signals (aids) to clash.....train one response at a time.
- Shape the horse's responses.....reward *every good try*.
- Match signal strength with response strength.
- Use downward transitions to delete tension and random movements.
- Don't overtrain ~ train 3 – 7 improved, near correct or correct repetitions, then rest, then again.
- Constantly check self-carriage, (releasing rein contact) during training.

Whilst good trainers and 'horse whisperers' may be adept at avoiding and resolving conflict behaviours, their actions are translated as 'feel' or as having a 'way with horses' and their skills rely on no formal base of mechanistic principle. Consequently, contemporary equestrian literature is dogged by a humanistic interpretation of horse behaviour, and is at a loss to adequately explain conflict behaviours. In horse training, there is a great need for the application of Skinnerian learning theory when injuries and death to humans and wastage of horses are considered.

Controlling wild horse populations (the wild horse killers)

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In New Zealand there is one large herd known of wild horses known as the Kaimanawa Wild Horses. In the 1980s and 1990s conservationists began to suggest that the Kaimanawa horses were damaging the environment especially the tussock grasslands and also killing specific plants of high conservation value. This led to a proposal to control the horse population but public opinion ranged from the strict conservationist wanting them eliminated to a pro-horse lobby wanting them left alone. Animal welfare organisations were concerned about the danger of a population collapse due to starvation. It appears that the horse population increased from about 174 in 1979 to about 1100 by 1990 and 1576 in 1994. The pro-horse lobby groups disputed these numbers and the census methodology.

Planning for population control began. Three methods of population control were discussed; killing, contraception and capture plus removal.

The RNZSPCA and the NZ Veterinary Association favoured shooting on the spot on welfare grounds. However, shooting was not allowed by the government. This veto was probably due a perception that government would be blamed for any injured animals which escaped the shooting, the poor “look” of dead horses littering the landscape and the fear of negative international press coverage. It was rejected also during an election year. The pro-horse lobby was being given sympathetic media coverage.

The pro-horse lobby favoured contraception specifically immunocontraception and this was tested on the wild horses using a pellet containing the antigens which was shot by an air rifle into the horses. It failed convincingly as a contraceptive and a further trial using injectable vaccine injected into wild horses held on a farm also failed to produce a constant immunological response. This failure caused quite a controversy as American experts had promised success. The researchers including the author were widely abused as having carried out shoddy research or deliberately cooking the results. Interestingly in the last 6 months one of the American experts has communicated to us the fact that the vaccines used, which were from their laboratories, were not any use!

The method chosen to manage the population was capture and removal. A total of 2032 horses have been mustered between 1993 and 2001 including a capture of 1067 in 1997. In this time one serious injury, a broken pastern, has occurred during capture and trucking off site. Older horses are sent for slaughter and foals and yearlings are purchased for breaking and training. Annual musters are carried out in June and one of the pro-horse lobby groups arranges for the sale of young horses. The horse population is to be held at 500 with annual counts and musters as required.