

Ethical Reflections on the Dignity and Welfare of Horses and other Equids

Pathways to Enhanced Protection

Summary Report

Masthead

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List of abbreviations

WADA	World Anti-Doping Agency
FEI	International Equestrian Federation – Fédération Equestre Internationale
FSC	Swiss Racing Federation
SEF	Swiss Equestrian Federation
GnRH	Gonadotropin releasing hormone
AI	Artificial insemination
IFHA	International Federation of Horseracing Authorities
SPA	Spatial Planning Act, Federal Law of 22 June 1979; RS 700
AniWA	Federal Animal Welfare Act of 16 December 2005; RS 455
OFiChev	Swiss Horse Industry Administration
OMédV	Ordinance of 18 August 2004 on veterinary medicinal products (OMédV); RS 812.212.27
AniPO	Animal Protection Ordinance of 23 April 2008; RS 455.1
FSVO	Federal Food Safety and Veterinary Office
ET	Embryo transfer
ETU	European Trotting Union

Notes on the Text

The notion of ethics undoubtedly plays an important role in our society. It evolves and differs according to the sensitivity of the environment, but doesn't bring together virtuous principles aimed at an ideal and absolute harmony, which we know is impossible to achieve. Even so, it behoves us – and it is our moral responsibility – to question the choices we make through our freedom to do right or wrong. Moreover, legal rules evolve along with the mores of a society and do not, themselves, have a moral character. Should we therefore only apply the laws of the moment and consider that anything that is not forbidden remains implicitly allowed? Or, on the contrary, are we capable of going beyond mere legality and asking ourselves: if we want to do what's right, or avoid doing what's wrong, how can we adjust our behaviour? If we know what consequences a decision may have on the interests of those around us (humans and equids), what should we do or not do? Is it worse to not do what we should do, compared to doing what we should not?

The Swiss Horse Industry Council and Administration, COFICHEV (formerly the Swiss Horse Industry Administration, OFiChev), instigated a discussion concerning the most essential ethical requirements. These discussions led to the realisation that there was a significant need for information and communication on such topics. For this reason, the COFICHEV analysed a number of current ethical issues and published an initial status overview as well as future perspectives (Poncet *et al*, 2011a, 2011b).

Ten years later, that report has now been updated, taking into account the most recent relevant scientific publications (Poncet *et al*, 2022). This Summary Report covers the full text's structure and its most notable points. Readers interested in more in-depth knowledge may consult the full version and delve into the details of the conclusions and recommendations. There, they will also find all necessary bibliographical references for understanding these complex subjects, as well as illustrations.

In general, the editors use the term “horse” to refer to the various breeds and types of domestic horses and ponies belonging to the species *Equus caballus*. The terms equids and equine refer to all modern, domestic members of the genus *Equus*, including horses, donkeys, and hybrids. Inclusive language has been used as much as possible. However, in order to make an already difficult scientific and specialised subject intelligible and easier to read, the editors have retained the style rule that permits the generic masculine gender (he/him/his) to refer to both sexes. To further avoid complicating the text, they have also opted to not include any doublets, typographical symbols, or marks that interrupt standard words of the language.

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1. A Paradigm Shift

The horse, once a livestock animal and a symbol of masculinity – serving as a social and economic engine reserved for agricultural work, transport, and the military – has now conquered the urban and female domains. Horses have become faithful companions for leisure and sport, and even for conversation. Sometimes, people even attribute feelings to horses. For a long time, however, the main actors in the horse industry focused on the market and on growth, without considering welfare to be a sustainability factor in its own right. This view strongly marginalised the interests of the animal.

Society's demands are increasing and are manifest in publications that call into question many practices involving horses – threatening the industry's social licence to operate (SLO). Public outcries and controversies primarily target the suffering that horses experience through their exploitation, as well as industry-related environmental damage. An initial analysis reveals that people approach the issue from two different angles. The most popular angle, the ethic of responsibility, aims to protect animals and tolerates their utilisation by humans in exchange for the care and subsistence we provide for them. This pragmatic and reasoned line of thought accepts, under certain conditions, the asymmetry of the relationship between humans and equids; it stems from the irreversible status of the domestic animal. By weighing in the interests of both parties (equids and people) with a just balance, it is possible to examine, from a moral point of view, how to minimise the intensity of a strain and justify it. On the other end of the scale, the angle of conviction ethics forms an opposite approach, rejecting the concept of any gap between humans and animals. As such, abolitionists and anti-speciesists radically advocate for the abolition of all forms of use of living beings, but, rooted in idealism, have little or no concern for the consequences of such a systematic position.

The COFICHEV supports the principle of personal responsibility towards the horse. From an ethical point of view, it defends the possibility of employing equids, provided that certain imperatives are respected. Only overriding interests can justify the strains. In addition, the day-to-day conditions of management (keeping), work, and transport, as well as end-of-life decisions, must respect essential welfare standards based on scientific studies.

2. Terminology and Definitions

In each specific field, specialised communication, exchanges, and transmission of knowledge require the use of a set of rigorously defined terms. They specify the denomination of frequently used, but often scholarly, concepts.

2.1 The Most Common Concepts

Ethics refers to a practical and normative philosophical discipline that indicates in a structured, yet value-questioning system how human beings should best behave towards each other and their surroundings. This approach therefore consists of methodical deliberation over the question of what is right and just. The Swiss Animal Welfare Act (Art. 3 AniWA) defines the terms dignity, strains, and welfare. Our discussion is based on these concepts and their interpretation.

The AniWA characterises good **welfare** as a state in which the animal does not experience negative sensations or sustained dissatisfaction of its natural needs. More specifically, the conditions under which animals are kept and fed should not disturb their bodily functions and behaviour. Nor should those conditions excessively push the animals' biological capacity to adapt. Thus, within the limits of that capacity, equids should remain able to behave in accordance with their species. They should be clinically healthy and free of pain, suffering, harm, and anxiety (Figure 1).

Today, (domestic) animal welfare specialists have developed a viewpoint that takes into account several parameters: positive emotions, good physical and mental health, appropriate function, and species-appropriate habitus. Currently, the best-known approach is that of the Five Freedoms, considered independent and indispensable: 1. Animals must have access to water and food in quantities appropriate to their species, 2. Their management conditions must not cause them any psychological suffering (fear, distress, etc.), 3. They must have a certain degree of physical comfort, 4. They must not be subjected to any ill-treatment that could cause pain or injury, and they must receive treatment in the event of illness, 5. They must be able to live in an environment appropriate to their species. These parameters reflect an ideal and theoretical state characterised by the absence of negative signs. However, the essential conditions for welfare and for the sustainability of anticipated progress are lacking in order to specify whether welfare is minimally acceptable, good, or excellent in concrete situations. To this aim, numerous studies are currently underway to find reliable indicators based on the animal and on the environment (Figure 2). Such indicators

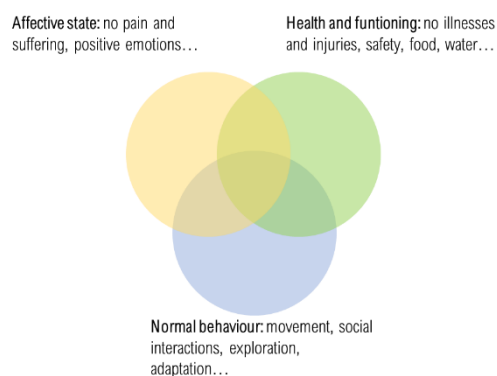


Figure 1 Representation of the state of good welfare in three dimensions (modified and adapted according to Fraser, 2008)

can help assess and improve welfare. The AWIN (*Animal Welfare Indicators*) protocols for horses and for donkeys meet these objectives. In practice, they are widely used.

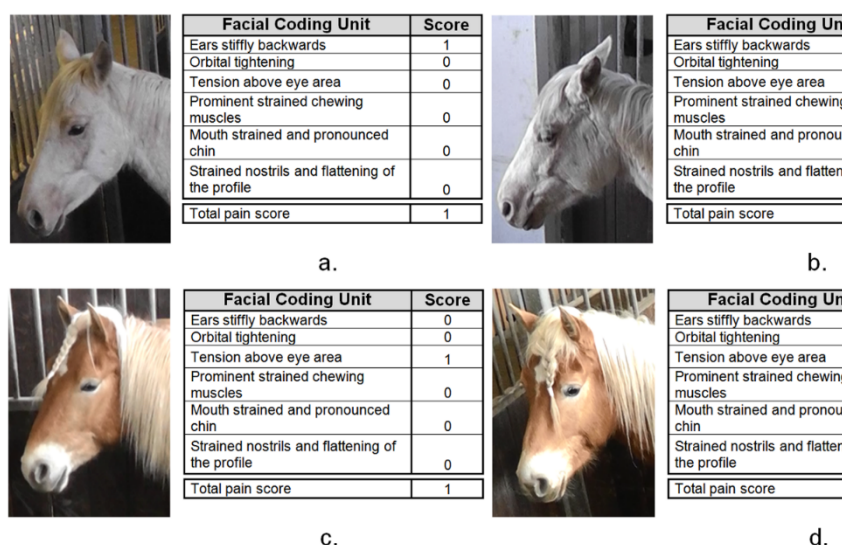


Figure 2 Illustrations of scores 0-2 on the facial grimace scale for assessing pain levels (source: Dalla Costa E et al, 2014, <https://doi.org/10.1371/journal.pone.0092281.g003>, Creative Commons Attribution License)

According to the AniWA, **dignity is each animal's inherent worth** that humans must uphold in their relationships with that animal. This means that we must respect each animal for himself or herself (including individual particularities, behaviours, and preferences). We must therefore take that unique worth into account and hold each animal in high moral regard, independent of our own impressions, opinions, and experiences. As such, animals' inherent worth should not be tied to their instrumental usefulness, nor to their sentimental, heritage, or market value.

Strain is a physical or psychological action by a human being to impose a benefit. In extreme cases, the term also includes any violence applied to animals to force them to do something against their will or to prevent them from doing what they want. The definition also covers the negative consequences of such actions. Strain always affects dignity. Dignity is only comprised, however, if overriding interests cannot justify it. This is the case, for example, when animals are subjected to pain, suffering, or harm, or exposed to anxiety or humiliation, or undergo interventions that profoundly alter their appearance or abilities, or are excessively objectified as instruments, also known as instrumentalization (Art. 3 AniWA).

The AniWA (art. 4) prohibits the unjustified¹ and unnecessary imposition of strains on animals (injury, pain, stress, restriction of freedom, overwork, etc.). Implicit in this standard is the need to weigh the different interests of the parties involved (humans, animals, and the environment) to determine whether the strain is justified. If its impact on the horse outweighs the interests of the other parties, the strain in question is abusive and amounts to a contempt of dignity.

The concepts of **pain**, **suffering**, and **harm** are not easy to distinguish, but understanding them helps to clarify any impairments to welfare. **Pain** is characterised by an unpleasant sensory and emotional experience associated with real or suspected tissue damage (lameness, colic). It is noted that donkeys do not show pain as blatantly as horses do; they remain more stoic. Animals experience suffering as negative emotions that affect their quality of life and impair their welfare. **Suffering** is expressed through abnormal behaviour and body language (facial expressions, ear position, postures, etc.). **Harm** is manifested by loss of functionality or behavioural disorders, such as limited responsiveness to stimuli. It appears when animals are pushed to extreme levels of adaptation.

Anxiety is also part of the negative emotions group. Whether sporadic or long-lasting, anxiety is characterised by a state of alertness, a disorganisation of self-control, and a decrease in the ability to adapt to variations in the environment. It constitutes a strain that provokes stress and suffering. It occurs under certain threatening conditions that are particularly anxiety-provoking and stressful, such as transportation in a vehicle, road traffic, participation in a sporting event, or farrier and veterinary care. Anxiety can manifest as a sudden – sometimes brutal and dangerous – fear response during new or unexpected situations for the horse. It is not always easy to distinguish it from shying, fear, and phobias.

Shying occurs when horses confront something unknown to them. They use a natural means of protection that has no direct impact on their welfare state. They back away, snort, and then begin to explore. **Fear** is an instantaneous and more intense emotion felt in the presence of an object, or event, detected or perceived as a danger or threat. In proximity, this alarm system leads to a defence or avoidance response – the fight or flight reaction. The animal is mobilising adaptive faculties and a self-preservation instinct. **Phobia** is different from shying and fear in that it always occurs disproportionately and in anticipation, when the horse has

¹ Emphasis added

not had sufficient habituation to control any natural responses to the trigger. This is the case when the horse's capacity to adapt has been exceeded.

Humiliation occurs when the situation meets any one of the following criteria. The animal is mechanised and used only as a machine. He or she is ridiculed, represented like a lifeless thing or an object, or subjected to measures that totally remove all sense of control. Certain breeding goals or practices can humiliate an individual, a group of animals, or the animal in the abstract sense (type, breed, etc.). In short, this strain means that the animals are not seen for what they are.

An intervention profoundly alters the appearance or abilities of an animal when it leads to a loss of functionality (Figure 3) or to an intense loss of abilities, if it causes humiliation, perturbing the aesthetic appearance (naked dogs), or if it is long-lasting or irreversible, such as clipping dogs' ears or amputating horses' tails (tail docking, or caudectomy). Impaired faculties may also manifest as adaptive disorders to environmental change, deviations from species-specific development (behaviour, growth, etc.), or reduced responsiveness to external stimuli. **Excessive objectification, or instrumentalization**, is a strain arising from the practice of turning equids into mere devices at the hands of humans, without any sensitivity to their specific needs or to their physical and psychological interests.



Figure 3 Horse suffering from hyperkalaemic periodic paralysis (HYPP) with a conformation characterised by hypertrophy of the musculature (source: murphy2136, screen capture <https://www.youtube.com/watch?v=4ZGYxiNQynM>)

Risk assessment

When accepting personal responsibility, **risk assessment** represents an indispensable step in the analysis of an ethical issue. Depending on the probability and intensity of damage, the risk may be negligible, low, moderate, high, or catastrophic. The subjective perception of the level varies among individuals, depending in particular on the ability to anticipate. The threshold of acceptability of a risk depends on several parameters. In particular, the expected benefit compared to the damage incurred, the possibility of repairing the damage or not, as well as the existence of a less damaging alternative which would nevertheless allow similar results.

3. Ethical Principles

Anyone caring for an equid must assume individual responsibility for the animal's management and use. Such individuals must take into account the specific needs of the species (feeding, health, movement, social contact, enriched environment, sense of security, rest, etc.). Furthermore, they must develop a harmonious relationship with the horse based on mutual trust.

This duty extends to the verification of facts (age, illness, inability to satisfy the animal's needs) and the decision to be taken when a sick animal can no longer be effectively treated. In such a case, an end-of-life event (slaughter or euthanasia) should be performed to free the animal from irreparable suffering or disorders without waiting for death to occur spontaneously. The fate of the animal's remains is also a matter for ethical consideration. In addition, this responsibility implicates several commitments on the part of the caretaker:

- **Regular acquisition** of in-depth **knowledge** with regard to equine species (natural needs, health, behaviour, biomechanics, appropriate use, dignity, socio-cultural and heritage values), and societal concerns and sensitivities.
- **Development of the capacity to assess the risks** equids face and **to understand reality from their point of view**; not attributing them with characteristics and feelings specific to human beings; keeping in mind that affective and anthropomorphic views do not provide appropriate remedies to any infringements on their inherent worth.

The ambitions and economic interests of individuals and organisations must not override animals' health requirements, nor those relative to their welfare and dignity. These points should be given primary importance irrespective of the breed, age, sex, individuality, or type of use of the horse.

The correct use of a horse is based on the constant respect of his or her natural aptitudes, physical and psychological constitution, and current capacities, without resorting to the use of chemical substances, such as drugs, or of unsuitable aids or methods.

This attitude requires people and organisations to be self-critical and to behave with respect, honesty, and courage in their relationships among humans, among members of an association and its leaders, and between humans and equids.

Finally, people who care for equids must consider their relationships with them as historically determined and therefore subject to evolution, improvement, and maturation.

4. General Ethical Issues

4.1 Thought Processes

Several strains result directly from the domestication process of the equid species. These include, for example, freedom of movement restrictions (stables, pens, tethering, etc.), more or less severe limitations of social behaviour, submission to human authority, irreversible modifications of physical appearance through the selection of certain appealing traits (docility, strength, speed, endurance, coat characteristics, etc.), and hereditary diseases.

In return, equids enjoy a number of benefits: food security, safety and protection from predators, shelter, and healthcare. Their employment can thus be partially justified by these advantages – provided, however, that they outweigh the strains resulting from their direct employment for our own benefit. These include, for example, the contribution of equids to our psychological balance and enjoyment, recreation, and various services they provide.

The process of domestication has not changed the original behaviour and natural needs of the horses of the steppes. Even today, horses move along grazing fibre-rich forage for two-thirds of the day – when humans allow them to do so – and their social instincts motivate them to gather in herds. Even so, domestication has significantly reduced horses' levels of flight and aggression, providing for a docility that favours interactions with humans and improves safety.

Horses and equestrian activities have attracted young women from both urban and rural backgrounds. This gender makes up 67.8% of equid owners in Switzerland. In the hierarchy of domestic animals in the modern Western world, horses have thus risen to the rank of companion animals alongside cats and dogs. Such an orientation has positively correlated with concerns for animal dignity and welfare. In this respect, the expectations of society, in particular of authorities, organisations, and individuals, have clearly increased. Consequently, the lifelong ethical responsibility for equids begins at their conception and birth and continues during their management as young animals on the breeding farm, their training, their active careers, and their retirement, through to the end of their lives. That said, the legislative system imposes standards that are based on minimal agreements.

4.2 The Field of Tension between Livestock and Companion Animals

Today, equids are caught between the varying and conflicting definitions provided in Swiss legislation (OMédV and AniPO). The proportion of companion animals is constantly increasing (Figure 4). The legalistic approach to livestock based on hygiene and food safety no longer corresponds to the most widespread socio-cultural perception, as all equids provide services. On the one hand, livestock animals are likened to a kind of living machine under aggressive human control in their role of transforming nutrients into goods and services. On the other hand, despite good intentions, qualifying horses as companion animals carries its own share of risks. It can lead to exaggerated care (coat clipping, blanketing, industrial food, supplements, obesity...) and to a level of anthropomorphism that demeans animal nature. This new hierarchy of types of equids aims to grant the companion animals a superior and protected dignity by excluding them from the food market. They would thus place them in a kind of elite class. Furthermore, the promotion of their role as companions for human beings could lead the public to believe that underworking them or not working them at all represents an ideal. The risk, in the long run, would be that this exclusion would be seen as a decisive step in favour of their welfare, especially as their employment for entertainment is – often erroneously – seen as benevolent and harmless. Such a development could drive equids out of agriculture and into the realm of luxury entertainment.

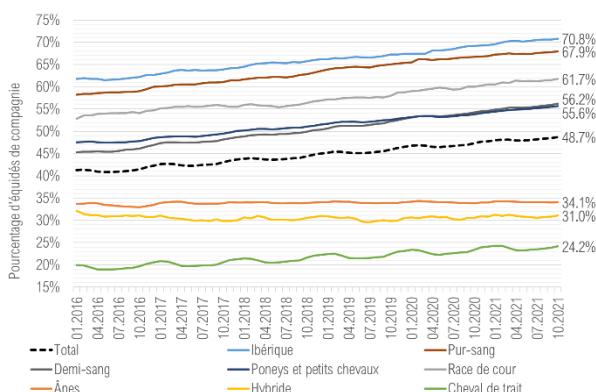


Figure 4 Evolution of the proportion of equids for companionship and as livestock according to the types of equid (source: Identitas AG, 2021a)

4.3 Equid Management

The living conditions of equids represent one of today's most debated issues. In our latitudes, most domestic horses live in very controlled environments. This is particularly true for those involved in leisure activities and in a wide variety of sports activities. The AniPO requires people who manage more than five horses to take training courses and prove that they have the necessary knowledge to handle the animals properly.

Individual box stalls remain the most common traditional housing mode, although group management has increased significantly in recent years. There are countless guidelines, checklists, and codes of conduct explaining how to keep and care for horses.

However, certain aspects remain marginal, such as managing donkeys, hybrids, and uncastrated male equids (for sports or reproduction), as well as castration, the use of electricity to limit movement, environmental impacts, and industry sustainability. Even so, some avenues merit particular mention. These include measures to reduce the impact of equestrian facilities and practices, optimised use of antiparasitic substances and antibiotics, improving plant biodiversity with mixed grazing (cattle and horses), and improving pasture management through enrichment with legumes, rotations, trees, hedges, agroforestry, and the development of active paths.



Figure 5 Horses kept in a building zone (Photo: Swiss National Stud)

However, responsible and appropriate husbandry and employment depends on the facilities. On the one hand, animal protection legislation mandates a number of structures and practices that are very difficult to achieve in agricultural areas. On the other hand, society demands extensive space (stables, paddocks, pastures, etc.) for managing equids. The latest provisions of the Spatial Planning Act (SPA art. 16a^{bis}) have eased certain requirements related to keeping and working equids in agricultural areas. However, they only concern existing farms² that have pastureland and produce the majority of their own forage³ base. Finally, keeping equids on lands zoned for construction remains difficult due to the high value of the land.

4.4 The Employment of Equids in Sport

The position centring on equine welfare, the equine-human partnership, and the sustainability of horses in sport is an area yet to be explored, particularly when an instrumental and commercial approach detaches from their nature as animals. Equestrian practices thus entail risks that expose equine athletes to physical and psychological harm, strains which play a significant role in career interruptions and terminations. However, the very nature of their use does not allow for the correction of all negative effects. For example, the stress caused by starting young animals under saddle or by the first transport experiences does not seem to be completely avoidable. If we also take into account the diversity of the equipment and facilities required for the various disciplines, we can also see that there is a wide range of factors that can adversely affect the equine welfare. In all contexts (from leisure activities to high-level events), improving the equids' living conditions remains a delicate task, due to the complex and very heterogeneous relationships that humans develop with them.

Compared to recreational equestrian sport, competition imposes a higher degree of physical and mental strain. Not only is a more intense athletic performance required of the horse, but also an adaptation of their management and handling conditions. For example, they are often body clipped and rugged all year round, isolated in individual boxes during competitions, and transported several thousand kilometres a year by truck or plane. Certain disciplines are therefore subject to particular criticism (endurance, eventing, show jumping, racing, etc.).

Despite advances in knowledge about welfare, there is still significant room for improvement, and higher-strain practices are not being satisfactorily reduced. Injuries, neglect, mistreatment, doping, performance-enhancing practices, sudden death, the fate of animals after retirement, and the retraining of racehorses are of concern to the public and the media. There is even a sense of unease among the public, veterinarians, and ethologists, which is echoed in the media. Even so, the various players in the equestrian and racing industries struggle to redefine themselves and to assert the legitimacy of their sport. There is still a risk of leaving horses and their health in second position, well behind the desire to win, the prestige, and the financial stakes.

The early training of horses is still a subject of discussion. Today, many trainers no longer place riding techniques in the foreground, but rather seek a collaboration with the horse. Animal behaviour and psychology are part of their concerns. This is why, in many training stables, horses are educated first on the ground before being ridden. Unfortunately, many riders are still unfamiliar with the fundamental principles of training that make respectful training possible.

National and international federations have rules designed to ensure the welfare of the horse in competition. However, they still face difficulties in adapting them to current issues and challenges, in communicating the new rules in an understandable and convincing way to their members, and in training the officials responsible for enforcing them. Changes sometimes instigate a hostile attitude from professionals.

The answer to these welfare issues lies nonetheless in the knowledge provided by scientific research and transmitted to the greatest number of people. Firstly, the recognition of indicators of impairment to the health, dignity, and welfare of equids involved in sports deserves close attention. Indeed, the equestrian population does not clearly understand the links between the signs of equine

² Existing agricultural enterprise with a total labour requirement of 1 SLU (standard labour unit). The cantons may lower the limit to 0.6 SLU. As a reminder, 1 horse LSU (Livestock Unit) = 0.03 SLU (1 adult horse = 0.021 SLU) and 1 ha of agricultural land = 0.028 SLU.

³ It is generally assumed that 70% of the forage should come from the farm and 0.245 ha/horse.

distress and the parameters that cause these negative emotions. They therefore misunderstand the factors that deteriorate animal welfare and cause safety problems. In order to reduce the problems, it is therefore considered legitimate to devote more attention to this issue in the education and awareness programmes set up by equestrian organisations. However, success depends largely on how equestrian athletes perceive scientific advances, and then accept or refuse to apply them.

The Risks of Strain for Equids in Sport

The strains generated by stressful situations in sports activities and health disorders raise concerns among the public, the media, veterinarians, and ethologists. These groups also express apprehension about threats of drug use during training, prohibited medication, doping, and the uncomfortable issue of the future of athletes after a sporting career. Including these issues into the weighing of interests allows them to be justified or condemned. Several books, publications, studies, and reviews have evaluated the variables that can immediately or indirectly generate stress, limit performance, compromise welfare, impair health, or modify behaviour. Unfortunately, there is little scientific research taking a deep look into the various risk parameters for welfare, such as by means of multivariate models. These could include the discipline (riding, driving, etc.), the level of difficulty, the qualification of the athletes, the age of the horse, or the conditions in which horses are managed and trained. There is a greater number of publications evaluating such situations in racehorses (gallop and trot).

In summary, sport-related strains affect several vital systems. These include pathologies of the limbs (joints, tendons, ligaments, feet), the back, and the muscles; digestive system disorders (colic, metabolic issues, gastric ulcers), respiratory diseases, anxiety and fear reactions, thermoregulatory problems, overtraining, overuse, and overwork.

In racing, similar cases are observed, but with a higher frequency of accidents with fatal outcomes (cardiovascular origin) due to fractures or sudden death. Researchers have identified nearly 300 risk factors for lethal harm caused by the nature of the track surface, racing conditions, and the age of the animals.

Recommendations are addressed primarily to the federations concerned. They should take regulatory and organisational measures to ensure closer monitoring of horses to detect imminent or early signs of lesions. The need to legislate more precisely on the employment of horses seems desirable, but the multiplicity of disciplines makes it difficult to draft clear and satisfactory rules. In this respect, the organisations are still the best placed to formulate technical requirements, but these only concern the equestrian minority who take part in sporting events under their authority. Finally, the measure that can reduce the practice of human behaviour that is detrimental to equids remains the basic and continuing education of the riding population at all levels and of those active in the industry. The skills of the teaching staff play a crucial role in the transmission of knowledge. Such skills must be based primarily on the results of scientific research on equine welfare.

In the future, federations will face the major challenge of developing educational and public relations concepts to raise awareness about the welfare and dignity of equids (leisure, racing, competitions, etc.). Furthermore, they will have to encourage a paradigm shift and a change in the scale of values in any interactions with equids. Even so, merely emphasising the central place that animal protection holds will not suffice. They will still need to provide tools (equine ethology, determining factors, biological and behavioural indicators, evaluation and monitoring systems, etc.). These tools make it possible to identify the characteristic signs of discomfort.

5. Specific Ethical Issues

COFICHEV has carried out a detailed and critical analysis of ethical issues relating to particular practices that may be encountered with equids that are bred, managed, and employed in the domestic environment.

5.1 Management of Uncastrated Male Equids

The de-socialised management of unsterilized male equids (stallions and jacks, whether for breeding or not) in domestic environments is a subject that has grown in importance over recent years. Generally, males are castrated only if they have no chance of serving as breeding stallions after a sporting career. However, observations regularly reveal that managers often do not know these animals' natural needs, nor the extent of the difficulties involved, as they have not acquired the appropriate skills. Some even consider their management as rewarding, very interesting, or even fun. In reality, the majority of uncastrated males live in very restrictive conditions (individual box stalls without permanent access to a paddock). In such an impoverished environment, their demands for social (bodily, visual, olfactory, and auditory) contact and free movement are rarely satisfied. Furthermore, they often cannot retreat and avoid the excitement caused by the continuous proximity of a dominant or threatening conspecific. Their reproductive expressions include the risk of sexual frustration, a source of chronic stress. This strain may become manifest through self-mutilation, including biting of the flanks and thighs, aggression, or other undesirable and even dangerous behavioural problems for the animal and for humans.

To avoid such problems, the social stall can serve as a respectful solution allowing for the expression of essential contacts (Figure 6). The frequency of agonistic interactions decreases very quickly and remains low after a few days. Following a period of acclimatisation, an uncasterated male can be kept in a group of geldings or mares between breeding seasons. The establishment of a bachelor herd is a well-described alternative. Keeping a stallion or jack in a stable also requires some basic precautions. Staff should be educated in proper handling and practices. Mares and jennies should not be housed in neighbouring stalls or paddocks. A solid fence around paddocks should prevent escape and injury. If more than one horse in the stable is to be taken outside, the stallion should always be taken out first. The use of punitive and coercive means to control sexual behaviour in male horses is unjustifiable as it hinders their welfare and shows disdain for their inherent worth.



Figure 6 Interaction between two stallions housed in social box stalls (Source: Swiss National Stud)

5.2 Castration

In our regions, owners castrate a very large proportion of their male foals from the age of one year onwards, mainly because of their lack of prospects as breeding stock. This is certainly the most frequent operation performed on horses. This strain affects the dignity of the horse, as it profoundly modifies the animal's capacities and appearance. It is justified by the overriding interest of the security it brings to the male and those around him. Questioning the removal of the testicles in order to respect the bodily integrity of the uncut male is not in itself decisive or sufficient, especially when taking into account how the management context, mediocre care, and strains (frustration, behavioural problems) can compromise the animal's welfare. Even so, the surgical technique can only be legitimised if it is carried out effectively and safely and is followed by pain management therapy.

In the absence of veterinary reasons, the usefulness of sterilizing a female is much more difficult to prove, especially when arguing that oestrus-related behaviours make participation in sporting activities difficult or impossible even though alternatives exist. Convenience operations aimed at modifying the normal reproductive behaviour of a mare remain unjustified in all cases. There are only a few provisions that legitimise chemical or surgical interventions on the sexual physiology of a mare. First, the equine gynaecologist and ethologist (if necessary) must establish the clear causal link between the pathological functional state of a mare's reproductive organs and negative effects on her welfare and personality. Laparoscopic sterilization is preferred. In the absence of such a diagnosis, but where welfare is impaired, ovariectomy is unjustified as long as specialists have not attempted prior conservative treatment (intrauterine technique, hormone therapy, GnRH inhibition, conditioning, etc.) to inhibit oestrus or to reduce its intensity and duration.

5.3 Restricting the Movement Range

By nature, horses live in large territories (Figure 7). The artificial environment of domestic stock-keeping systems necessarily results in a reduction in the space available to the equids and a restriction in their movement range. This restriction remains slight for groups of animals living in semi-liberty on vast terrains, but it is substantial and decisive for those housed individually. Under the current conditions, the materialisation of this restriction can influence behaviour and welfare. For example, when the minimum bedding-covered resting area is increased, lower-ranking animals lie down flat and sternal for longer periods of time. Aggressive traits also decrease with increasing paddock size. This effect is particularly remarkable up to 10 000 m².

Space restriction is necessary but justified if the horse's safety and capacity to adapt are respected. Proper safety is characterised by the use of materials that resist impact without breaking and presenting a danger. The border (fencing, walls) should minimise the risk of injury while optimising security by preventing escape (Figure 8). The AniPO prohibits fencing off enclosures with barbed wire. Diagonally woven wire mesh or knotted wire netting is not recommended. Paddocks may be closed off with electric fencing only if they are large enough and arranged in such a way as to allow the animals to avoid each other and keep a sufficient distance away from the fence. Consequently, this clause (AniPO Art. 35 para. 5) no longer tolerates the use of electricity to separate the small paddocks connected to individual box stalls. It also requires that equids be allowed to move about every day (through controlled exercise or turnout).



Figure 7 Arid steppes, the natural habitat of the horse (source: Marián Polák, https://upload.wikimedia.org/wikipedia/commons/8/82/Mongolia_2012.jpg, Creative Commons Attribution-Share Alike 4.0 International license)



Figure 8 Large turnout area for breeding stallions. An electrified cord complements the galvanised metal and treated wood fence. (Source: Rachid Gharbi, https://cdn.pixabay.com/photo/2015/12/05/18/00/frank-mountain-1078558_1280.jpg, Pixabay License, free for commercial use)

Walkers and treadmills are sources of strain. The restricted freedom of movement combined with the impoverished environment leads to an unnatural situation. Without stimulation, the animals can become bored and lack motivation. But sporting results also depend to a very large extent on the mental disposition of equine athletes. Among other issues, such equipment alters several phases and characteristics of locomotion. The strains are particularly significant when the treadmill replaces free movement in the open air.

The use of this equipment is only justified under two conditions. First, housing and turnout management must be able to satisfy these needs in a sustainable manner. Second, the temporary use of this type of equipment must never replace the obligatory free movement in the open air. The animals must have paddocks in which they can decide their own pace, direction, and speed of movement for themselves. If the facilities and the financial and human resources are insufficient to guarantee an equine athlete appropriate training and correct activity in

the open air, the solution can only lie in converting to different management conditions or disciplines.

After having spent the first part of their lives in a group, young horses experience a profound change of environment when they begin training. They are almost always managed in an individual stall during this period, which causes a strain. An optimal alternative would be to keep them in the company of other horses of their own age. Social boxes are a very good solution.

5.4 Identifying and Branding Equids

Non-invasive, individual, and unambiguous identification has undeniable and overriding advantages. The use of a microchip, in addition to the equine passport, is justified in view of the low strain and the absence of modification of appearance.

In short, an identification system (marking, database, legislation, documents) fulfils two functions in animal traceability. First, it serves to recognise individuals and differentiate them from others as reliably as possible. There are multiple benefits to this: ownership, epizootic and animal protection surveillance, technical breeding, genetics, food safety, and sports documentation. Second, identification proves the animal's status as belonging to a certain population – a country, a breeding organisation, an association, or a group of vaccinated animals.

In recent decades, discussions have focused almost exclusively on justifying the strain and pain associated with identification. The hot-iron branding system has been a subject of great passion, as it has a very important cultural value in several regions (Germany, Camargue, Iberian Peninsula, etc.), especially those where cattle branding is still traditional. In Switzerland and its neighbouring nations, the majority of breeders now consider iron branding unjustified and have abandoned the practice. Indeed, any method that alters the physical appearance (hot or cold branding, tattooing, etc.) causes stress while the animal is being restrained and pain during the marking process, as well as over the days that follow. However, if the intervention is small and localised, it does not cause significant modification or loss of functionality in the terms of the legislation (AniWA art. 3).

The individual and unambiguous identification of equids presents such undeniable benefits for society and for the animal that it is worth protecting. It contributes to preserving the animal's health during transport or infectious disease outbreaks. These benefits, in addition to the graphic and descriptive identification forms contained in the passport, therefore justify its practice. The low level of strain and the absence of modification of appearance associated with microchipping do not prove to be preponderant. By contrast, hot and cold branding and tattoos cause excessive strains and risks (stress, pain, risks of injury and complications). Their cultural value and their competitive added value remain insufficient to legitimise such practices.

The wealth of data provided by identification (megadata or big data) opens new perspectives. The risks and opportunities related to those perspectives remain to be characterised, and related new challenges remain to be met in several areas (data ownership, rights of use, blockchain and value chain, etc.).

5.5 Exaggerated or Inadequate Care

In their natural habitat, equids maintain their health on their own through their specific behavioural traits. In domestic conditions, this defence opportunity is restricted, often substantially, by the way they are managed and worked. Their caretakers must remedy the negative consequences of these deficiencies and treat any unhealthy animals.

Some aids can help minimise or eliminate problems associated with management. Muzzles slow down the ingestion of food in order to slim down an equid that has become obese through overfeeding and inactivity. Sheets protect pastured horses from insects or summer dermatitis. A mask (Figure 9) can provide relief for horses suffering from headshaking syndrome.

However, some treatments are aimed only at modifying aesthetic features or facilitating the animals' employment. In situations of mediocre management, earplugs protect equids from excessive noise, and cribbing straps stop horses from performing this stereotypy. Many people shave their equids' manes, or clip the hair inside the ears, the leg feathers, the facial whiskers, or the pasterns; they pull or shave the tail bone; they shorten the tails or add tail extensions. They also feel obliged to rug their horses. They erroneously believe that the animals are suffering from the cold, without realising that the lower limit of the equine comfort zone varies between -15 and $+5$ °C, much lower than that for humans. That is why humans have to wear clothes if the temperature drops below about 25°C , whereas horses' coats and undercoats reduce heat loss and protect them from humidity. Furthermore, many members of the horse-riding population overlook the potential dangers of heatstroke when they rug their horses after exercise. Finally, in many situations, measures to protect the hooves are still necessary.



Figure 9 Protective mask. It reduces headshaking. This equipment hinders the mobility of the ears and restricts visual acuity (Source: AnemoneProjectors, https://upload.wikimedia.org/wikipedia/commons/6/66/GOC_Kimpton_010_Horse_%285722588184%29.jpg, Creative Commons Attribution-Share Alike 2.0 Generic license)

In addition to tactile hair clipping and certain farriery practices which have been prohibited by Swiss law (AniPO Art. 21), several of these practices must be abandoned, as they constitute unjustified physical or psychological strains. They cause frustration, reduce the protective functions of the hair, mane, and tail, restrict sensory perception (ear nets, masks), and hinder the satisfaction of natural needs (feeding, mutual grooming, self-grooming) and physiological and behavioural adaptation capacities (thermoregulation). Research is still needed on investigating strains and their causes, including hereditary diseases and interactions between genes and the environment.

5.6 Auxiliary and Restrictive Tack

Several pieces of equipment (halters, bridles, bits, tongue ties, nosebands, reins, draw reins, training aid systems, bearing reins, etc.) act on the heads and necks of equids. They counteract their nature and biomechanics. They cause significant strain, as they can cause severe pain or impede breathing (Figure 10 and Figure 11). Furthermore, they are detrimental to welfare when they exert coercive action aimed at keeping horses submissive and providing the desired performance. The same applies to devices that impair vision or hearing, such as tightly closed blinkers, earplugs, or thick ear coverings. In particular, stress and anxiety can have disastrous effects on the horse's confidence and emotionality and can lead to reactivity or conflict behaviour. There are also cases of learned helplessness, in which the animal no longer reacts to stimuli, even when it is painful. Numerous scientific publications confirm these welfare deteriorations. In this respect, Swiss legislation (AniPO Art. 21) prohibits tying equids' tongues and holding their necks in hyperflexion ("Rollkur").



Figure 10 American saddlebred horse harnessed with a top rein (bearing rein, overcheck) and a running martingale on the reins. Extreme neck flexion and throat compression are undue strains. (Source: Jean, https://commons.wikimedia.org/wiki/File:Saddlebred_Stallion_in_Harness.jpg, Creative Commons Attribution 2.0 Generic license)

Essential corrective measures include checking equipment, becoming much more knowledgeable about indicators of poor welfare, and learning how to interpret those measures. Conflict behaviours and any signs indicating stress or discomfort must be monitored. Examples include bucking, rearing, resistance to handling, agitated ear and tail movements, forelimbs raised as a threat, stiff or irregular gaits, or a head-and-neck position that is behind the vertical, arched, or pulling forward. As for the head, all equipment should be checked, followed by the condition of the mucous membranes in the mouth, any painful lesions of the nasal plane, facial expressions involving the lips, nostrils, or eyes, and any unusual tongue or jaw movements. Particular attention should be paid to young individuals who do not show the desired level of talent and to adults who have been converted from another discipline.



Figure 11 Thoroughbred racehorse in training ridden with tongue tie, draw reins, and hyperflexion of the neck. Facial expressions (ears, eyes, nostrils) clearly show anxiety and discomfort (Source: <https://pxhere.com/en/photo/944322>, Creative Commons CC0)

The FEI and SEF have reduced the use of auxiliary tack. The crop or whip as a punishment tool remains prohibited in equestrian sports rules. Its use remains controversial in racing. In this respect, there has been an increase in its restriction in several countries around the world, as limiting or even eliminating the whip does not lead to slower race times.

The application of the twitch distracts the horse, induces the release of endomorphins, and makes it possible to carry out procedures that cause pain or anxiety. However, animals remember the discomfort they feel if they undergo repeated twitching. Whenever possible, gradual habituation to various procedures and the administration of sedatives are preferred. However, in emergency or time-pressing situations, twitching may sometimes be necessary.

Throughout the various practices and interactions developed between humans and equids, equitation scientists recommend searching for better understanding. Such closeness mainly involves respecting the

animals' natural dispositions, abilities, and availability, as well as the correct and logical application of current communication and learning theories. Interests based purely on performance or economics should not be given priority. To this end, we recommend that equestrian and racing organisations critically examine the justification and use of auxiliary equipment. In particular, they should consider equipment that is intended to modify normal functional abilities (in training or in competition), to compensate for inadequate skills of the athlete (equine or human) or that causes discomfort, pain, harm, or anxiety. On this basis, lists of permitted equipment can contribute to animal welfare.

5.7 Hoofcare and Farriery

Today, the issues of hoof wear and shoes are different compared to when horses used to work for several hours a day. Even so, examining the condition of the feet remains an essential part of welfare assessment protocols along with other symptoms of health or behavioural problems. Over the last few years there has been a growing tendency to suggest that horses can be worked without shoes and that natural wear and tear, good food, and correct hoof maintenance are sufficient. This philosophy is often and sometimes quite harshly opposed by farriers and those who fervently defend traditional farriery.

Farrier interventions (trimming, shoeing, foot care) do not only affect the visible part of the hoof capsule, but all the structures of the foot. They must preserve the foot's conformation and its functions (supporting the body, pressing against the ground, absorbing shock, and protecting the internal tissues of the hoof). Shoeing and barefoot trimming both have advantages and disadvantages. Scientific studies show that it is incorrect to suggest that shoeing always has lasting negative consequences on horse health. But it is also incorrect to imply that keeping working horses barefoot is the only way ensure their health. In some circumstances, each of these practices incurs the risk of increasing the impact of shocks on the foot if it is shod or of causing health problems if it is barefoot and unprotected. Furthermore, both shoeing and trimming can have a positive influence on locomotion.

There are many situations in which shoeing horses' hooves is beneficial to their welfare. Shoes are especially necessary if the animals are worked on highly abrasive silica sand found in riding arenas, on rocky paths, or on roads, and even more so over long distances. Some orthopaedic conditions can only be corrected with special therapeutic shoeing. Even so, shoes can alter the joint angles in the limbs and weaken the ability of the foot and associated tissues to absorb shock. Nevertheless, shoeing becomes obsolete in cases of horses that live on pasture and are only occasionally ridden (or driven). In addition, keeping horses barefoot is beneficial when it's possible, or when it's necessary in order to improve the conformation of the foot, for example. However, the properties of the hoof capsule make the hoof vulnerable. The walls break spontaneously when walking on hard ground. This is why trimming techniques must follow certain rules. Indeed, the situation is in complete contrast to that of free-ranging horses that go without hoof care. In these conditions, the length and shape of healthy hooves are mechanically adjusted through wear and breakage of the hoof wall. The intensity of this depends on the type of ground (hardness, abrasiveness) and the weather, but is characterised by cracks and tears in the lower wall, as well as a shortening of the toe.



Figure 12 Polyurethane hoof boot. It is used to replace or supplement shoeing, as well as to protect a foot (mainly the sole) that is injured, weakened or undergoing treatment. (Source: Swiss Army - documentation - military farriery 64.010 f, with the kind permission of Colonel S. Montavon, Swiss Army Veterinary Service). Montavon, Swiss Army Veterinary Service)

In the case of a foot that does not present any health problems, the choice (shoeing, barefoot, hoof boots, etc.) depends above all on the way the horse is managed and worked as well as a careful weighing of the pros and cons. Hoof boots are a temporary alternative. The main objective is to ensure the durability of equids' athletic abilities while ensuring their health and welfare. From the moment equids are born, they are a priority for their health, fitness, and welfare. Farrier care every 6 to 8 weeks is essential. This should be accompanied by good hygiene in the animals' bedding and turnout areas, daily free-range movement, and a feeding plan adapted to the animals' needs.

To conclude, we note that the majority of trotters in France race without shoes. The superior expansion of the hoof capsule and its direct contact with the ground are believed to improve proprioception and performance. However, this technique can weaken the wall, horn growth, and the quality of the horn. Deprived of the protection provided by the sole and the wall, the tissues weaken. Starting from the first time the shoes are removed, the sensitivity of the foot increases, and the bone experiences slight inflammation after the race.

5.8 Transport

Horses have to change locations for many reasons. Even under optimal conditions, transport is a cause of stress and strain for equids (adaptation, confinement, restricted space and field of vision, physical exertion, noise, climatic conditions). Short journeys incur risks of injury in particular.

The most significant strains – gastrointestinal (colic) and respiratory problems, death, and euthanasia – occur mostly during long journeys (>24 h). The habit of keeping horses' heads tied above the withers (for safety reasons) encourages shipping fever and pneumonia. This posture interferes with the mechanism (mucociliary escalator) that removes contaminants from the lower airways. For this mechanism to function properly, the head needs to be positioned below the level of the withers.

Intercontinental movement of horses for competition, racing, and breeding occurs by air. The International Air Transport Association (IATA)'s Live Animal Regulations have significantly improved animal air travel conditions through the use of larger and faster aircraft, higher pressurised cabins, and safer aluminium containers.

Several measures make it possible to significantly reduce the strains imposed on equids and to justify them. The Swiss and European legal requirements must be respected (duration of journeys and breaks, responsibility of transporters, requirements for vehicles, professional skills, bedding, attachment devices, minimum dimensions, etc.). Then, it is necessary to acquire knowledge, to habituate the horse to transport, to plan the journey (route, weather, horses, food, vehicle, equipment, personnel), to equip the horses, to load and attach them correctly, and to manage the journey carefully (monitoring, rest stops, safety, etc.). Driving problems (sudden braking, jerking, taking turns and curves too fast) are also sources of accidents.

The strains the animals experience are unjustified if the people responsible for transporting them have not taken the necessary steps to reduce them. The administration of sedatives prior to the journey is not justified.

5.9 Doping and Medication of Sport Horses

In sports terms, **doping** is the administration, inducement, or facilitation of the use of substances, products, or procedures in the context of sporting event that are likely to modify, other than by normal training and feeding methods, the ability of a horse or to mask their use during a screening test. In addition, the term **medication** refers to applying medicine intended to prevent or treat disorders to an equid. Most medications are prohibited in competition, as well as during race training (Figure 13). Unauthorised substance administration occurs as a result of fraud, negligence, or ignorance. To simplify matters, many organisations and federations use the term “doping” to lump all these practices together.

In equestrian events and racing, it is accepted that equine athletes can only perform if they are in a fit-to-compete condition. In short, the animals' condition must meet three requirements: their conformation must ensure appropriate function; they have benefited from proper training; and they are in good physical and mental health. All people working with equids must take into account the animal's natural capacities, attitude towards the exercise, and welfare. They should set realistic sporting goals and avoid physical and mental overexertion. Equine welfare and fair play must always take precedence over pride and commercial interests. These fundamental ethical principles require professional and technical skills, as well as the ability to build and maintain relationships and share common values with the relevant people, especially in organising the period necessary for full recovery before resuming training.



Figure 13 Racehorses are screened during both racing and training. (Photo: Softeis, <https://commons.wikimedia.org/wiki/File:Horse-racing-1.jpg> Creative Commons Attribution-Share Alike 3.0)

The administration of prohibited products during recovery and training may place excessive demands on the capacity to adapt to physical work and generate strains. Such strains occur when the intensity of activities interferes with the recovery from the conditions that led to the training interruption. In order for animals to gradually regain their strength and health, ethics requires the establishment of an interval between the health problem and the resumption of physical exertion. This period does not depend on the presence or absence of prohibited substances or any traces of them during a screening test. What matters is waiting until a horse is fit for training again, and only after that point to consider starting the animal in a competitive event.

Doping and medication analyses reveal only a few cases out of thousands of samples. These results bring competitions into disrepute, as the public now reflects a growing societal awareness with regard to respecting the welfare of equids involved in sports. The legislation of several countries, the anti-doping regulations of national (SEF, FSC⁴) and international equestrian and racing federations (FEI, IFHA, UET⁵) and the World Anti-Doping Agency (WADA) group together doping and medication. They also publish ethical principles and draw up procedures for testing, analysing samples, and sanctioning those defined as Responsible Persons (rider, trainer, etc.).

Strict Liability constitutes the foundation of anti-doping regulations. Unlike civil or criminal liability, it is characterised by the absence of any criterion of guilt (existence of fault), but imposes a duty of diligence. It is thus up to the Responsible Person to prove that he or she took all reasonable precautions to prevent the unintentional administration or presence of traces of a prohibited substance in an equine athlete. For this reason, most Federations consider that such a residue in a sample is sufficient to violate the rules, even if the amount would no longer have an effect on performance. Disqualification of the horse and prize withdrawal remain inevitable in the case of a positive test result. The principle of Strict Liability does not violate the fundamental rights of athletes. It is justified by the public interest and constitutes an appropriate standard to ensure the protection of the welfare of the equine athlete. This clearly aligns with jurisprudence established by the Court of Arbitration for Sport and the Federal Supreme Court of Switzerland, both in Lausanne.

Equestrian and horseracing authorities, as well as laboratories, continue to search for new generation techniques (biological passports and longitudinal career monitoring) to trace the most recent fraudulent or negligent practices. At present, they are mainly concerned with the contamination of horses through forage in particular, sex-specific hormones in equine athletes, and the dangers of genetic manipulation.

The Doping of Tomorrow

The discovery of the CRISPR-Cas9 gene editor has propelled the fight against doping into a new era. Gene doping includes various methods that modify the genes of somatic cells, for example muscle cells. This would result in stronger, faster and more resilient athletes who could be pushed beyond their usual limits. Gene editing can also be applied to germ cells (sperm and egg cells), ensuring that new traits are passed on to offspring. It is also possible to introduce an altered gene into a diseased organ, for example by intra-articular injection of a mutation that codes for therapeutic products.

The concerns of the racing authorities are of an ethical and health nature because of the damage to animal dignity and welfare. This type of doping represents a major risk of instrumentalization. It makes testing difficult and threatens the integrity of equine athletes, respect for rules and regulations in competitions, and the sustainability of breeding. Furthermore, these manipulations affect the way the public and industry players alike perceive the image of these events. In fact, researchers are already proving able to create transgenic equine embryos.

Nevertheless, the clear distinction between therapeutic methods and genetic doping remains highly problematic, since the correction of any pathological condition concomitantly modifies sporting capacities. Even so, from an ethical point of view, the use of techniques that transform the genetic heritage of living beings is a very serious blow to the inherent worth of those living beings, whether animal or human.

Recommendations

We strongly recommend that sports, racing, and breeding federations publish a specific report on their anti-doping screening tests and results (monitoring and reporting) every year. They should also check that their system fully complies with the legislation (AniPO Art. 16 para. 2 letter h) and prohibits the use of gene editing.

These organisations should reinforce the training of the equestrian population in question. Courses should include the rules for the use of medication, the respect of an interval between a health issue and the resumption of training, and explanations of objective responsibility.

Swiss legislation prohibits germline gene therapy in humans, but not in animals. We recommend introducing a ban on molecular genetic techniques in animals in the AniPO.

⁴ Swiss Horseracing Federation, *Fédération Suisse de Courses des Chevaux*

⁵ European Trotting Union, *Union Européenne du Trot*

The fit-to-compete check of each equine athlete by the official veterinarian and the judges should be intensified and applied more systematically. Measures for traceability (treatment journal), delegation of responsibilities, and official health, fitness, and medication checks should complement the current anti-doping system. Daily or at least weekly reporting in a central register of any medication administered to a horse in training by a commissioned or approved veterinarian would be an appropriate solution.

In the future, federations should also look at the possibilities and opportunities of new technologies (blockchain), as they store information in a clear way, and give secure access without a supervisory body. They could help spread the image of clean sport where animals are involved.

5.10 Horse Welfare at Spectator Events

In Switzerland, the participation of mounted troops in events is based on military tradition and the memory of the cavalry formations, which were disbanded in 1972. European countries also have great equestrian customs during their national events. These events usually proceed with no particular issues, as the experienced trainers are familiar with the relevant difficulties and frequently prepare for these activities on public pathways. Their leaders instruct the members and the animals accordingly, by reconnoitring the terrain beforehand, for example, and regularly practising more complicated or delicate situations.

Many gatherings are dangerous, however, because the participants and their horses come from various neighbouring regions and meet on the same day without much preparation. They rarely inspect the route to identify dangerous and stressful places (metal plates, slippery surfaces, steep slopes, etc.), construction sites, or potential sources of noise or commotion (Figure 14). Unforeseen events or bottlenecks slow down or stop the progress of a procession, placing the animals in strained situations. The press has reported accidents at these festivals; horses have slipped and fallen during the procession or died suddenly. Other sources also confirm that some horses are given a dose of sedatives when they are likely to face particularly stressful conditions.

We recommend that event organisers select horses that are destined for public use. Stable human-horse pairs should be accustomed to stressors and changes in the surroundings. Testing in situations as close to reality as possible would identify equids that are unsuitable for this type of exercise and unable to acclimatise to repeated stimuli. The animals would have to withstand the stress without the help of sedatives. Organisers are encouraged to take measures and issue regulations to facilitate the passage. In particular, they should specify verifications at the starting point, the order and position of the horses in the procession, the places where they can turn around in the event of a slowdown, protection against slipping, the creation of a professional monitoring and emergency team, an information and communication concept, and the required behaviour of the participants.

Cinema and Artistic Equestrian Shows

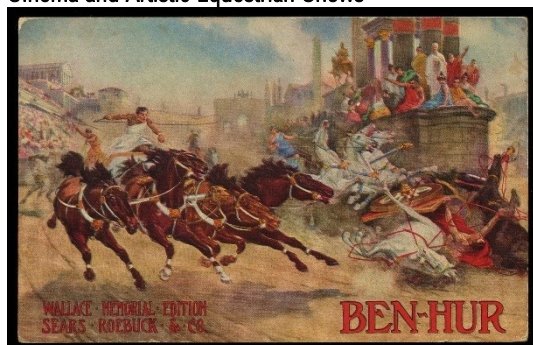


Figure 15 The movie *Ben-Hur* (1907), postcard (1908), Sears, Roebuck and Company (Source: Steven R. Shook Collection, <https://www.flickr.com/photos/shookphotos/4326161155/in/photostream/>, Creative Commons Attribution 2.0 Generic)



Figure 14 Horses galloping around the burning and exploding Böögg during the Sechseläuten in Zurich in 2007. (Source: Fortunat Mueller-Maerki, <https://upload.wikimedia.org/wikipedia/commons/f2/UmrittSechselaeuten2007.jpg>, Attribution-ShareAlike 3.0 Unported license)

Horses have been part of the cinema since the beginning of the 20th century and have played an essential role in historical scenes, westerns, and cloak-and-dagger films (Figure 15). Along with the dog and the cat, the horse is the most frequently seen animal in movies. Many horses are only extras, in the wild, under saddle, or pulling a carriage. For the most part, their activities do not differ from their usual work. However, some spectacular scenes can be particularly straining, especially if the horses lack appropriate preparation and training. Examples include induced falls or the administration of narcotics or sedatives in stressful or dangerous sequences with stunts and special effects (smoke, pyrotechnics, various kinds of equipment, etc.).

Equestrian artistic performances come in a wide variety of forms. They involve the arts of dance, music, theatre, and circus. They are generally based on the traditional disciplines of equestrian art (dressage, and free movement), vaulting, driving, and stunts. The identification of strains is often difficult. Mild signs of health problems are difficult to discern from a distance, as the animals often appear only briefly in motion. Veterinarians and well-trained people can easily recognise pain affecting a limb (lameness). Anxiety, fear, and stress signals can also be visibly detected in certain scenes. Of

particular note is the typical body language that can be identified within seconds (ear movement, tail swishing, facial expressions, defecation, locomotor activity, etc.).

The American Humane Association's guide recommends measures for animal housing (safety, water, forage), training and working methods (humane, proper tack and equipment, etc.), monitoring, and veterinary examinations and interventions. Furthermore, no drugs (anaesthetics, sedatives, laxatives, pain-hiding analgesics) should be administered to an animal for filming or performing. These instructions can be used as a model to prevent problems during shows or other employment of equids. They can help clarify how to stage stunts, falls, use of vehicles, water scenes, and various disciplines (racing, show jumping, etc.). For fire-branding or killing an animal, we recommend the use of simulation and computer-generated images. In short, the level of detail of the requirements goes far beyond what is found in sporting regulations and legislation.

Live Pony Carousels

Stationary carousels where tied-up ponies turn around in a circle to music, pulling a cart or being ridden, have been strongly criticised in Europe and are gradually being banned (Figure 16). In Switzerland, riding schools or owners come to an event for a few days with staff and ponies. They take children for rides in tents or open-air paddocks.

Noise and environmental disturbance cause the greatest strains. However, the animals seem to habituate, especially when covered facilities reduce noise emissions. The main problem is that the ponies walk in circles for hours, often without changing direction. However, the weight of the children does not pose a risk to the animals.

We recommend that competent people lead the ponies and that adequate facilities, even if temporary, are provided for riding. In particular, these should include generous dimensions, good-quality footing, and the possibility of turning in one direction and then in the other. In addition, it is necessary to manage the animals properly during the event. They should be provided with living and working conditions that respect their natural needs (freely available water and forage, regular rest periods, social contact, a stimulating environment, walls that allow withdrawal, etc.).



Figure 16 The pony carousel at the Wiener Prater in Austria, which closed permanently in 2016. (Source: Jeremy Thompson, US, [https://commons.wikimedia.org/wiki/File:Wiener_Prater_114_\(4482849100\).jpg](https://commons.wikimedia.org/wiki/File:Wiener_Prater_114_(4482849100).jpg), Creative Commons Attribution 2.0 Generic)

Shows and Breeding Competitions

Livestock and horse shows and competitions take many forms in Europe. These gatherings, organised at local, regional, national, or international agricultural fairs, last from a few hours to one or two weeks. Historically, they have served breeding and commercial market needs.

Swiss animal protection legislation (AniPO) sets out clear requirements for the management of animals at events. They must not be exposed to more risks than are inherent for that particular event. For example, they may be kept tied up. In terms of respect for their inherent worth and their welfare, managing animals is largely characterised by temporary or old stables. These conditions, sometimes rudimentary, are far removed from the ideal situations for equids kept in groups on pasture or in open stall systems. Furthermore, the animals presented at these events express natural behaviour (confrontation, agitation) upon their arrival, particularly when they are gathered together, which sometimes does not correspond to the expectations of uninformed spectators.

The main actors, mostly men (breeders, trainers/riders/drivers, organisers), remain very attached to traditions. From a historical point of view, they constitute a relatively closed social milieu. However, these activities have gradually opened up to a wide public, which used to be rural and popular, but is now more urban, curious, and emotionally motivated. Professional practitioners demonstrate their technical know-how and their individual methods of working with horses. Meanwhile, visitors observe, smell (hay, manure, sweat, leather, etc.), listen (hoof steps, whinnies, calls, squeals, grunts, etc.), and hope to rediscover old sensations. Some also cast a new view of the relationship between equids and humans and confront the image with their own representation of the horse. The growing gap between reality and their expectations then highlights the role of equids that have gradually become companions and partners. When these worlds do not understand each other, these exhibitions give rise to controversy between parties who confront, despise, or, even more seriously, ostracize each other.

In this field of tension, pragmatists propose an adjustment of the equestrian environment to the societal requirements favourable to their effective employment, but respectful of the dignity and welfare of the horse. The measures that organisers should take to this end are to improve management conditions and to observe how the animals adapt to the new environment after their arrival. In this context, they must learn to recognise the risk of injury and the intensity of the manifestation of strains, including long-term stress and overwork. With regard to management, restrictions are only justified if they remain within the legal framework. Equids should be allowed to express their natural behaviours, in particular lying down, standing up, establishing social contacts, eating and drinking regularly, and being able to move freely every day. It should be noted that some reactions (fear, locomotor activity)

may result from the presence of the public and a holding arrangement that prevent withdrawal and avoidance. Signs of undue strain, such as behavioural problems or persistent signs of stress, indicate that the animal's capacity to adapt is overwhelmed. The organiser should provide box stalls which have a part of the wall that allows the horse to retreat. If such a remedy is not possible, the horse should be removed from the crowd.

5.11 End of Life

The end of life of equids and its management constitute major issues in ethical considerations. Swiss legislation does not contain any regulations that absolutely protect the life of an animal in the same way as for humans, even though the loss of the animal's life represents the greatest harm it can experience. The law does not encourage keeping animals alive at all costs, but limits itself to reprimanding cruel or malicious killing.

Putting companion equids to death is much more difficult to authorise, especially from the point of view of animal dignity. The care of old or injured animals in order to prolong their lives is a legitimate ethical concern, but this practice goes beyond the legislative framework of animal protection. It is therefore a matter of individual responsibility. It extends to the time when the owner has to decide whether the animal can no longer be cured and should be put out of his or her misery, as well as to the period before, for example, retirement (Figure 17). All of these phases involve strains that the caretaker is obliged to keep to a minimum. In senior boarding facilities, these primarily include anxiety, physical and emotional stress, problems with access to food, free movement, deteriorating health, and then slow agony in the case of persistence and delayed decision-making. Euthanasia by lethal injection is also a source of strain if not carried out according to approved methods. On-farm slaughter with stunning (piercing rod gun) followed by bleeding also allows for a proper and low-strain end of life.



Figure 17 An ill, aged horse. Without a confirmed diagnosis, Cushing's syndrome is suspected. (Photo: Anne Ceppi)

We recommend that people who manage professional boarding centres for older horses, as well as veterinarians, attend appropriate training courses. There, they can acquire knowledge and regularly update that knowledge. This includes in particular the concepts of strain, dignity, and welfare, as well as the process of weighing interests.

5.12 Meat Production

Legally, the principle of slaughter is justified by the need to obtain food of animal origin. The legislation requires that the production process be carried out correctly (healthy animals, correct breeding, management, transport conditions as well as conditions for putting the animal to death and keeping any negative impacts on the environment reduced to a strict minimum). However, the process – from the transport of the animal to stunning – is a source of stress and carries the risk of excessive strain. In addition, small, local facilities used to offer a very favourable environment (quiet, individual treatment). Today, the tightening of sanitary standards has concentrated equids in large establishments (an industrialisation of slaughter in restricted areas). These conditions often prevent an ideal process adapted to the equine species. On-farm slaughter is now authorised. It allows a procedure that is very respectful of the animal's inherent value.

The sale of horsemeat is also justified by two arguments. First, the waste of protein resources does not meet sustainability criteria, and, second, humans cannot directly add value to the green areas and forage consumed by herbivores. However, negative environmental impacts or sub-optimal husbandry and transport conditions should not override these points. Finally, from an ethical point of view, no argument can justify importing horsemeat to the detriment of the local market if it is produced in deplorable management, transport, or slaughter contexts, which seems to be the case overseas.

6. Breeding Equids

6.1 Introduction

The conditions in which breeding stallions are managed, the use of coercive devices, the strains caused by the transport of breeding animals, and the potentially negative effects of gene editing (CRISPR-Cas9 technology, doping, and gene therapy) are discussed in the previous chapters. This section develops considerations on some practices that affect equine dignity and welfare.

The AniPO defines breeding as the targeted mating of animals to achieve a specific goal, production that uses artificial breeding methods, or reproduction that is carried out without a specific programme. Good breeding practices require working with and producing animals that are healthy and true to their species in terms of behaviour and physical appearance. Where appropriate, they will also show themselves capable of sustained performance (in the broadest sense).

These concerns should be essential elements of the objectives to be achieved, the preservation of genetic resources and the protection of welfare and dignity. Even so, these considerations do not seem to be a priority for many organisations, especially when their breeding measures focus on maximising results and practical aspects. This is why current practices are subject to debate. There are several elements that give rise to ethical considerations:

- Breeding goals that favour the emergence of extreme hereditary traits. These are considered desirable by fans of certain breeds.
- Technologies specific to the domestic environment (live cover, artificial insemination, *in vitro* fertilisation, embryo transfer, cloning, etc.).
- Young horse training.
- Entering breeding mares in selection and sports events.

Finally, we do not address in detail the welfare problems caused by health disorders on breeding farms, especially infectious diseases, although they can cause pain, suffering, and harm. A number of aspects of animal breeding are also not addressed, as such practices are marginal or absent in Western countries. This is the case, for example, with breeding programmes that meet the growing demand for donkey skins for the production of *ejiao*, a gelatine used in traditional Chinese medicine that is said to have anti-ageing and rejuvenating properties.

6.2 Hereditary Diseases

Genetic faults have a negative impact on the reputation of a breed and the commercial value of stallions and broodmares. Scientific publications list nearly 250 such defects, which affect practically all functional systems (locomotion, respiration, metabolism, reproduction, immunity, sensory nervous system, etc.). They are caused by a deleterious gene (monogenic defects) or the combination of several mutations (polygenic diseases). Some of them have a pleiotropic effect, as they cause both a coat characteristic and a disease. Some coats in particular are linked to strains which can sometimes be very severe (overo paint spotting and Overo Lethal White Syndrome (OLWS); splashed white and congenital deafness; leopard coat and congenital night blindness (Figure 18); silver coat and multiple ocular congenital anomalies; grey coat and melanoma).



Figure 18 Horses with a leopard spotted coat (Appaloosa) have an increased risk of night blindness. (Source: Leonie Schoppema, https://cdn.pixabay.com/photo/2015/09/23/13/40/animal-953731_960_720.jpg, licence pixabay, free for commercial use)

Swiss legislation (AniPO Art. 25) requires that breeding projects aim to obtain animals in good health and free of properties or characteristics that are detrimental to their dignity. Furthermore, breeding goals that would restrict an organic or sensory function or deviate from the behaviour typical of the species are only permitted if they can be compensated for without the animal suffering with regard to care and treatments, management, eating, or physical integrity, and without need for regular veterinary treatment. More specifically, the AniPO prohibits the breeding of animals that are hereditarily deprived of body parts or organs commonly used by the species or that result in malformations that would cause them suffering, pain, or harm. It also prohibits the breeding of animals that exhibit behaviour different from that of the species and that would make it very difficult or impossible to live with other animals of the same species. In order to reduce the number of animals that are subjected to hereditary strains that affect their dignity, the FSVO has issued an ordinance. It states that breeding organisations are prohibited from defining a goal that aims to obtain animals with severe strains or from including such animals in their breeding programmes.

Therefore, breeding associations need to take more measures to monitor the frequency and mating of animals carrying the alleles responsible for the most important hereditary diseases (screening tests). Depending on the degree of severity, they should refrain from selecting certain traits, such as particular coats associated with diseases that cause severe strain.

6.3 Live Cover

In-hand-breeding is the oldest reproduction method used in horse breeding. This means that a person leads and holds the stallion while he mounts the mare. In contrast to the conditions in the wild, the mare is not free, and the stallion manager decides when mating takes place. Current society questions this practice as a potential form of rape.

Servicing is an abusive strain if the female is not fully in heat, is defensive or anxious, or subjected to acts of coercion. When breeding in hand, injuries to the vagina, as well as those caused by the reactions of unreceptive mares or mares who are not fully in heat, constitute the main risks. Breeding hobbles attached to the pasterns or hocks (Figure 19) can also cause severe wounds and put the broodmare in a panic situation, which can have lasting negative consequences. As for the stallion, injuries mainly occur due to the mare kicking his chest or penis and to falling during and after mounting. In addition, the use of a nose twitch or sedative during live cover is an abusive strain.

The live cover method can only be justified if optimal measures are taken to ensure that the stallion, the teaser mare, and the breeding mare can express at least a large part of the sexual behaviour typical of the species. In particular, they should be given a sufficient pre-ovulatory period, and the breeding male should be given the necessary time to recover when he remains mounted on the brood mare after ejaculation. In addition, all measures should be taken to prevent injury, accidents, and the transmission of venereal diseases, especially contagious equine metritis (CEM), or other epidemic diseases.

Pasture mating in a herd allows animals to show all their reproductive behaviour, as interactions between stallions and mares are continuous. Furthermore, these more natural conditions could explain why fertility with in-hand live cover is much lower than that found in a harem of horses and in natural settings for donkeys. Furthermore, this method avoids much of the risk, but limits the choice of sires. Even so, natural settings should not be idealised because in free-ranging herds, stallions can also be observed harassing and attacking mares, for example when they are not loyal to the group or during competitions between stallions to win them over.

Stallion managers and people responsible for breeding projects must obligatorily receive adequate training, in particular with regard to the technique (pre-mounting period, the mating act itself, etc.), typical equine sexual behaviour, and appropriate facilities (housing for mares and stallions, teaser mare stocks, equipment, etc.).



Figure 19 Breeding hobbles and tail wrap
(Photo: Swiss National Stud)

6.4 Artificial Insemination (AI)



Figure 20 Semen collection on a dummy (Photo: Swiss National Stud)

Artificial insemination (AI) has clearly gained in importance in horse breeding in recent years. It remains strictly forbidden for Thoroughbreds. The AI procedure involves not only the methods of placing the semen in the mare, but also of collecting and preparing it for storage and transport. AI has several advantages and higher efficiency depending on whether the doses are fresh, chilled, or frozen. Semen quality can be verified each time semen is collected. The conception rate is higher than in natural breeding. More mares are impregnated, regardless of location and time of year, as approximately 20 transportable doses are produced from a single ejaculate. In addition, the deep intrauterine deposition of the semen allows for a minimal dose and does not seem to irritate the mucous membranes. Only 50 million sperm are used instead of the 250 - 500 million needed for standard insemination.

Among other advantages, breeders appreciate the increased safety for animals and staff. Thanks to the transport of chilled or frozen doses, the palette of available breeding stock has widened. Compared to natural breeding, stallion managers are interested in reducing physical and psychological stress caused by covering mares. With AI, they can harmonise their commitments to breeding and to sports, improving their notoriety through good performance results. AI also offers the possibility of impregnating mares whose fertility has been reduced due to injuries caused by covering or foaling. In addition, AI saves the broodmares from long journeys and stress, as the semen is transported to them instead. By taking all the necessary hygiene precautions, the transmission of diseases is eliminated.

This reproductive method is justified provided that trained persons proceed according to established rules. To the greatest extent possible, the stallion and the mare, who almost never physically meet each other, should still be able to adopt and express the typical sexual behaviour of their species.

Among the potential strains imposed on the stallion in an AI programme, health security requirements lead to management conditions in which the stallion is isolated and deprived of any interaction with mares, or with other horses, depending on the circumstances.

AI limits the sexual behaviour of mares and stallions. However, they should at least be able to express the typical pre-copulatory behaviours, especially vocal, olfactory, and tactile contact, with a conspecific. Even when semen collection is carried out on a dummy (Figure 20), the presence of a female can motivate the stallion. As for the mare, she should show signs of oestrus when presented to a teaser male. In order to be inseminated, she must be in the right phase of the cycle, and her cervix must be sufficiently open. Otherwise, problems can arise, especially inflammation of the uterus. In particular, inseminating a mare that is clearly not in oestrus and not receptive is an abusive practice, contrary to what some breeders and inseminators believe.

6.5 Embryo Transfer (ET)

After some initial technical difficulties, excessively high expectations from breeders, as well as biological and technical breeding obstacles, the non-surgical method of embryo transfer (ET) has now become established. It allows several foals to be obtained in the same year from a mare that remains in competition. Practised commercially on a large scale, ET has spread particularly to the USA, South American countries, and, to a lesser extent, Europe. The number of ETs has reached more than 20,000 per year. In Switzerland, there are only about 20. At the same time, several technologies for assisted equine reproduction are being developed. These include egg retrieval, intracytoplasmic sperm injection (ICSI), and cryopreservation of embryos produced in vitro (in-vitro embryo production, IVP). It should also be noted that ET is still prohibited in Thoroughbred breeding. In Standardbred trotter breeding, the number of embryos remains limited to one foal per year, and the breeding commission must approve the donor mare.

A weighing of interests should be carried out in each case to assess whether the expected benefit of ET justifies the imposition of strains on the donor mare, the recipient mare, and the stallion. For the stallion, the technique does not generally involve specific risks or strains other than those commonly accepted for natural breeding or artificial insemination (pain and stress during handling). When the respective cycles of the biological mother and the recipient mare are spontaneously synchronous, the procedures (fertilisation, flushing of the uterus, non-surgical trans-cervical insertion of the embryo) only subject these females to low to medium levels of psychological stress, which is rarely preponderant. However, embryo collection and transfer operations are carried out 7–10 days after ovulation during the dioestrus of the cycle. At this point, passage through the vagina and cervix is no longer considered natural.

Even so, there are additional strains that must be taken into account when weighing the interests that may be much more intense, risky, and unjustified. Examples include obtaining oocytes by surgical puncture and aspiration of follicles (sedation, epidural anaesthesia, anti-inflammatory drugs, antibiotics, etc.) and the surgical transfer of fertilised eggs. The injection of hormones also causes significant strain. They are administered to initiate a new cycle immediately after flushing the biological mother (prostaglandins), to coordinate potential recipient mares, or to maintain pregnancy if there is a concern that progesterone levels are too low. Some practitioners also use ovariectomised (surgically sterilised) mares as an alternative to synchronising a recipient and a donor. In addition to being less successful, this technique requires the daily application of hormones to such mares. These strains are almost always unjustified.

Visibly, ET presents the major danger of neglecting the animal dignity of donor mares, their embryos, and recipient mares. However, the embryo and foetus are apparently never conscious after fertilisation and during the first part of gestation.

In conclusion, embryo transfer can only be legitimate if the biological parents meet certain conditions. They should have an objectively very high genetic value (biodiversity), their level of health should be impeccable, and their management and working conditions should satisfy their natural needs, especially sexual, as for other reproduction methods. Finally, the ET team must have sufficient skills (technical and ethical), and use only recognised, non-surgical techniques which are in accordance with accepted protocols and which offer success rates exceeding 75%. Furthermore, any risk of instrumentalization must be excluded. If any of these conditions are not met, the ET is not justified.

6.6 Reproductive Cloning

Cloning makes it possible to obtain animals that have the same nuclear genetic heritage as the donor (the original). The process consists of taking the nucleus of one of the animal's somatic cells and then reinjecting it, unaltered, into an egg cell that has been enucleated beforehand. Under ideal conditions, this new cell becomes an embryo once it is implanted in the uterus of a surrogate mother. This process has been known in equine reproduction since 2003. Now about 20 years later, market observation shows that the method has not triggered a great deal of interest among sport horse breeders in Europe. Resounding successes of clones in international competitions are still to come. However, there is a growing interest in this practice in Quarter Horses and polo breeds in the USA, Argentina, and Brazil (Figure 21). It has taken on a new dimension with the use of mesenchymal stem cells and genetic engineering technologies. In the near future, the CRISPR/Cas9 technique may prove effective in modifying the equine genome in the early embryonic stages (The Doping of Tomorrow p. 22).

The Strains of Cloning

The original horse is not subjected to any particular strain. The recipient mare experiences only low to medium psychological stress of short duration during the gynaecological examinations and the implantation of the clone through the natural route. However, the intensity of the stress and pain can be seriously aggravated if surgery and hormone replacement injections are used during gestation. The exchange of the cell nucleus, the preparation of the embryos, their placement in the recipient mare, and gestation are delicate procedures that very often fail. Massive loss is observed during the oocyte maturation process and during gestation. With regard to gestation, it is estimated that it takes three to four pregnancies to produce a live foal, which corresponds to a high embryo loss of about 75%. Finally, the number of stillborn foals, new-born foals lost in the first few days or suffering

from immune deficiency, and muscle and bone deformities, still seems high. All these factors make cloning very straining and expensive.

Those in favour of cloning seek to preserve and maximise the gene pool of stallions and mares with high breeding and economic potential. They hope to gain a decisive competitive advantage. Even so, this approach negates genetic progress, as the technique can only transfer an old genome into a much younger body. Furthermore, the clones do not turn out to be exact duplicates of the model; many variations in physical appearance can be observed, the origin of which can be environmental, genetic, or epigenetic. Finally, with nuclear DNA markers, it is not yet possible to distinguish between the various clones derived from an original and the subsequent ones (clones of clones). In any case, several actors in the cloning scene have kept information about certain cloning operations to themselves, undermining confidence in the process. They have failed to communicate and have sought to conceal information relevant to serious breeders.

In Switzerland, the legislation considers cloning as an animal experiment subject to authorisation. The expected benefits must be weighed against any suffering involved before a decision is made. The import of semen and embryos from cloned animals remains possible without any special conditions. Sport horse breeding organisations generally register clones in their stud books and competition horse registers, but they do not allow gene editing. However, the use of cloning remains prohibited for Thoroughbreds, Arabians, Quarter Horses, and Standardbreds (trotters).

Conclusions

Today, there is no overriding argument to justify cloning as a method of breeding equids. The question of safeguarding genetic resources (endangered species and breeds) remains open. There is also no doubt that a great deal is being learned about equine reproduction from work on cloning. In the interests of transparency, studies should also be devoted to finding failproof biological identification means to distinguish between clones of the same animal, especially when they are used for breeding.

6.7 Training and Selection of Young Horses

The age at which young horses can be trained and exercised is a subject of recurrent discussion. Critics argue that young horses are healthy by nature and that forcing them to exercise at an early age would be detrimental to their health because they have not yet reached maturity. Scientific studies do not support these hypotheses.

First, maturity is defined in scientific publications as the stage at which physical (bone and muscle), physiological, and psychological development is completed. Compared to other species, horses are very precocious from the time they are born, especially with regard to locomotion; they can gallop within the first few days. Age, especially when based on the fusion of epiphyses and morphology, is not a relevant criterion that characterises the adequate time to cope with exercise without causing injury. Current scientific knowledge shows that horses do not reach their full physical, behavioural, and social maturity until around the age of 6 years. Some people go so far as to suggest that this is the right age to start initial training. By comparison, it is estimated that human athletes reach maturity at around 25 years of age, by which time many athletes have already completed their sports careers.

Second, contrary to widely held opinion, young horses do not necessarily remain healthy until they start exercising. Numerous scientific publications show that the first disorders of the musculoskeletal system (osteochondrosis, osteochondral dissecans (OCD), congenital contracted tendons) can appear very early, starting at birth, well before there are any significant demands on their musculoskeletal system. Some joint lesions become permanent at the age of one year and constitute a handicap for a competitive career. They affect Thoroughbreds and Warmbloods in particular. Heredity (status of parents, breeds) determines any predisposition to these juvenile pathologies. Management conditions also influence their development. In particular, errors concerning feed rations – often too rich in carbohydrates – and biomechanical constraints – foal movement in open fields that is not adapted to their needs, over-restrictive paddocks, inappropriate footing, limb deformities, trauma to growth plates, and inadequate exercise regime – have all been identified.

For centuries, the very concept of breeding has included the idea that the future breeding animals which best fit the demands should be identified as early as possible, before they start producing the next generation. This is done by monitoring the quality of performance over several successive generations. The heritability of the above-mentioned lesions is sufficient to allow for early and effective measures. Among their criteria for selection, organisations should look for the sustainability of health over a sporting career – in essence, selecting for functional longevity.



Figure 21 Eight cloned polo horses from the same mesenchymal stem cell line, born in August, September, and October 2016 in Argentina. (Source: Olivera et al, 2018, Creative Commons Attribution - Noncommercial (unported, v3.0) license)

But that's not all. A review of recent scientific studies shows that equine athletes benefit significantly if they start exercising when they are young rather than at an older age. Early exercise helps strengthen the musculoskeletal system and improves the functional longevity of sport horses and racehorses. Indeed, bone tension and compression are essential for proper adaptation and normal, continuous growth. By contrast, lack of activity in the early months (stall confinement) delays biomechanical and musculoskeletal tissue development (bones, tendon, and joint cartilage). Furthermore, young horses are at greater risk of being converted to other disciplines and having their careers cut short when they start training and competing late or only reach a low performance level. These publications thus refute the idea that starting horses early has long-term detrimental health consequences. On the contrary, training them and educating them to work under saddle can reveal, at an early stage, the individuals with physical and psychological constitutions that are too fragile for providing the desired results. They can thereby be redirected more quickly towards other, less demanding activities and avoid getting pushed beyond their limits.

In conclusion, the selection of young athletes remains essential. The relevant organisations (breeding, sport, racing) should also ensure that their welfare and inherent worth are not compromised during their initiation under saddle, training, and competitive events. Their training is only justified if it meets several conditions:

- The age of candidates in a selection test must not be less than 30 months for racing breeds and 36 months for other breeds.
- They must have free movement in groups every day, without being permanently detained in individual boxes.
- A veterinary check before starting them under saddle must aim to identify any pre-existing lesions.
- Trainers must take any animals with health problems out of training until they recover or convert them to a less demanding discipline.
- Subjects declared healthy in the pre-assessment must undergo regular and documented monitoring over the long term, throughout their preparation. A clinical examination must regularly verify their good health before they can participate in an event. They must be monitored throughout the event and be pulled from competing if they show signs of overexertion.
- The training team must adjust the intensity of exercise to each horse's age and training level. The horses must be allowed to show whatever talents and abilities they have at any given moment, without being subjected to undue strain.

6.8 Employing Pregnant or Lactating Mares

The involvement of pregnant and lactating mares in sport and leisure activities is controversial. The question arises as to how intensively and at what stages they can be worked!

In practice, a 6-week break after insemination is recommended. However, moderate exercise is still very important for maintaining good condition. It prevents oedema and obesity during gestation until foaling.

In the lactating mare, any temporary break in social ties affects both individuals. Strains affect the nutritional, psychological, and physical states of the concerned equids. Both mare and foal show distress and risk injury and accidents. The mare can suffer from sore teats, even sometimes developing mastitis. The foal may be malnourished due to fewer feedings and changes in the teats. These traumatic situations can lead to increased sensitivity at the time of final weaning and to behavioural problems. Temporary separation of foals from their dams is less restrictive if the dyad lives in a harmonious group of horses and if other females are part of their environment. This comforting social environment becomes even more important as foals approach a weaning age, as they will have already developed a certain level of independence.

If the facilities, equipment, and objectives are appropriate, broodmares – accompanied by their foals – can benefit from movement. They can also be moved together, and the foal can be left near the mare, if the purpose is to examine her or have her bred by live cover or artificial insemination.

According to our current state of knowledge, the strains caused by work related to training, competition, or intensive exercise, or by transport cannot be justified in the following two circumstances:

- Pregnant mares, at least starting from the 5th month of gestation.
- Separation, even temporary, of the mother-foal dyad during the first 150 days after foaling, especially when bonding and milk production remain high.

The overriding arguments are based on a few points:

- Animal protection (dignity and welfare).
- The risks of overwork for the mother and her foetus, and respectively her foal.
- Reduced safety for horses and humans.

In short, activities must be limited to moderate exercise necessary to maintain good physical condition.

6.9 Weaning

In a family group situation, the mare starts the weaning process spontaneously as soon as her offspring reaches the age of 9 to 10 months or even one year. It does not generate stress. The dissolution of the last mother-foal bonds, including social preference, occurs when the young equids leave their natal cell to join a bachelor herd of single males or another harem. In summary, this process takes place gradually without agitation and contributes to the food and social autonomy necessary for development up until sexual maturity.

On domestic horse farms, humans take over the weaning process, initiating it much earlier than in the wild for organisational reasons. For the foal, this moment is one of the most stressful traumatic events. Research topics have focused on how to mitigate negative emotions so as not to impair welfare. The process involves several difficult variables to manage. These include ways of dissolving bonds, feeding practices, management conditions, and available facilities. Studies show that physical separation is the most preponderant factor. In order to minimise the stress of weaning, the people intervening in the process must therefore control key parameters:

- Spatial separation and the distance between the mother and the foal. This phase allows, hinders, or excludes all or part of the visual, olfactory, and acoustic contacts.
- The living space, whether familiar or new, with or without the presence of other equids of similar or very different ages, or even unrelated mares.
- Feeding practices and transitions in ration composition (forage, concentrated feeds).

Today, the abrupt method is still the most common, at least in some regions. Nevertheless, the number of people who prefer gradual weaning is increasing. To date, discussions about the most ideal method remains open. A recent approach to the issue shows that the nature of the bond between the mother and the foal and the individual temperament of the foal play a major role. Foals that distance themselves more easily from their dams at three months of age are less emotionally reactive as adults and tolerate social separation well. Meanwhile, foals that spend more time suckling or attempting to suckle at 4-5 months of age are more likely to develop stereotypies later on.

Weaning without human intervention is not a solution for all breeding farms. As far as we know, no controlled method in the domestic environment can completely eliminate the stress of the equids concerned. In order to justify the remaining unavoidable stress, the foals' managers must implement alternative and palliative measures to avoid negative emotions and strain as much as possible.

Many procedures remain abusive during weaning:

- Separating foals from their dams and then confining them individually to a stall, even for a day, without regular interaction with at least one other foal.
- Weaning young equids who have not previously become accustomed to drinking on their own and consuming the forage to which they will subsequently have access.
- Providing high-carbohydrate or low-fibre rations.
- Regardless of the method, weaning a foal that has not reached at least 5 or 6 months of age.
- Taking advantage of weaning to multiply and intensify human interactions to the detriment of the social bonds between conspecifics required by the development of their species.

It can also be argued that the development of behavioural problems during and after the final separation procedure constitutes a sign that unacceptable errors occurred during the weaning process.

Perspectives and Conclusions

Equids – horses, ponies, donkeys, and hybrids – are now perceived in a very different way than they used to be. In their lifestyles (leisure, sport, tourism, media, technology, etc.), humans maintain a relationship with them that is quite different from what they develop with most animals. They now consider them as partners or companions, but also appreciate them for their athletic qualities or their work. These roles mark the various ways in which the two species interact. The issue of implementing welfare measures and respecting the inherent value of equids is of paramount importance. In addition to the significance of the breeding, management, and working conditions, the involvement of the parties concerned must be clarified. The primary responsibility for limiting strains lies with the people working in the various fields of the industry (breeding, management, disciplines, daily care, therapies, etc.). They are the ones responsible for weighing, in each situation, the different interests in the various contexts. At the same time, their organisations must also take on the task of adopting an ethical perspective when developing and adapting regulations that protect horses, educational programmes, and breeding goals. It is not appropriate for them to simply assert the primacy of personal responsibility for the objectives. Knowledge must be made available, distributed, acquired, and applied. For this reason,

they have a key role to play in training their members, who are generally unable to take on their obligations if they do not have the appropriate skills.

That said, this report shows that the knowledge necessary for the development of an adequate ethical attitude is lacking in several areas at present. We therefore recommend that the scientists of the equine research network address an increasing number of fundamental and practical issues in the future. The legislative authorities must continue their efforts to improve equine welfare and respect for their dignity, especially in their work or purpose. By funding projects, they must encourage the industry to reflect on ethical issues and help it make decisions and communicate. In this respect, this document emphasises the overriding importance of scientific findings. They should prevail over judgements based on assumptions, emotions, or references to any kind of utopic nature. To clarify what is still to come, we conclude that the current context already contains the main elements that will guide the paths that should be followed. Public concern is manifest, above all through people's demands about the kind of attitudes we should have towards living things; the more prominent a species is in the hierarchy of domestic animals, the higher the expectations of dignity and welfare. This transition poses new challenges to active members of the industry and forces it to look at those challenges from largely unexplored angles, such as the promotion and publication of good practice. In the future, work should be done on issues related to interspecies relations, communication, and the importance of gender, especially in tourism, event planning, and healthcare. Many perspectives (cultural, ethical, philosophical, psychological, pedagogical, sociological, etc.) can then open up.

In conclusion, it is reasonable to assume that the public will continue to express strong and legitimate expectations of the equine industry. In view of the regular questioning of sporting behaviour and of management systems, and the controversy surrounding certain practices, we consider it necessary to not leave the duty of vigilance solely to animal protection movements or to the authorities responsible for enforcing the legislation. If the industry is to retain its social legitimacy, people working with horses and organisations must prevent problems in the first place and periodically carry out an honest weighing of interests. More specifically, they must give top priority to the welfare of the equids, and respect for their inherent worth and their subjectivity, and not just focus on improving these points for the benefit of human beings. We therefore consider that an independent and permanent think tank commission dedicated to ethics in the equine industry be set up and financed by the structures concerned.
