
EQUINE BEHAVIOR AND WELFARE (ETHOLOGY)

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When studying the behavior of domestic species it is important to become familiar with, and be able to refer to the wild behavior of the species, which is a complete challenge since there are almost no more wild equines with the exception of the Pzewalski horse (*Equus ferus przewalskii*, Groves 1986).

Nowadays we can say that they are the only ones where it is possible to study equine behavior in its pure state. However, American wild horses descend from domestic individuals that recovered their freedom, and one characteristic that was observed is that as opposed to the former, these formed enormous herds where their original behavior was extremely modified and unstructured, which also affected the domestic behaviors they had acquired and which had been lost or altered.

The Psychology of a Prey

From the ecological point of view of a prey, the horse is a social animal that lives in a relatively complex structure within its natural environment, which determines the way in which its behavior is adapted to survival and to potential predators. Its safety is to be found in numbers, and the individuals maintain a fairly constant

proximity which depends on the time of year and environmental factors.

This is not a minor detail: the horse is an animal with a high degree of vigilance and it is not rare that it should be defined as “anxious by nature”.

Its sensor organs are adapted so as to be able to perceive any change in the environment, either movement or sound, and the emotional modifications of the individuals within a group are rapidly perceived by the rest. This characteristic that made it possible for them to survive in their natural environment, is what provides them with an extreme sensibility that occasionally complicates management of the sportive equine, above all the high performance animal, where the high demands made on it put its adaptation capabilities to the test.

Additionally, their high degree of vigilance also makes them vulnerable to becoming easily sensitive to stimuli which they must frequently live with, generating a situation in which emotional anticipation (a state of reaction in which the animal is very vigilant or reactive) generates high energy consumption which results in reduced performance.

Domestication

Apparently, after a long period of time in which there was no certain date attributed to the domestication of the horse, studies by Dr. Sandra Olsen (Botai Tribe-Eurasian Steppes) give us an approximate date around the year 5,600. At the same time, Natalie Stear, from Bristol University, carried out tests on pieces of pottery belonging to the same tribe, where she found equine grease, thus proving later that they belonged to mares' milk, which implied domestication.

As regards domestication, it is important to take into account that this includes modification on a genetic level of the species domes-

ticated, which goes beyond the characteristics obtained by means of human selection and which includes the different breeds. To put it simply, we could say that the nervous system in wild animals is closed at a certain age, thus the enormous amount of learning that occurs in the period when it is young, and which in the adult individual is much more limited. As opposed to this, domestic animals have the capacity to acquire functional learning for a long time after they have completed their development. In biology, there is a characteristic of youth that is observed in adults of a species in particular that is known as "neotenia". This capacity for learning more than what the "biological clock" determines for each wild variety comes within this classification.

It is probably Price's definition (1984) which is the best: "Domestication is a process by means of which an animal population adapts to man and to a situation of captivity through a series of genetic modifications that occur during the course of generations and through a series of adaptation processes produced by the environment and repeated for generations".

We could say, without fear of being mistaken, that this process not only implies the modification that we observe in the different breeds and bio-types, but also a profound modification on the behavioral level of the domesticated species over time.

The Domestic Horse's Behavior

As we mentioned before, the horse is a social animal that lives in groups or herds (gregarious) with a hierarchy structure that is only exercised when circumstances make it necessary. Thus, there is no conflict if the space and resources are sufficient

The horse is a rhythmic animal and its management of time is constant in a natural environment:

- 13 to 14 hours of feeding (more or less mobile)

The horse devotes the greater part of a day to feeding behaviors; it presents a varied food diet that includes grasses; bush shoots; leaves; fruit; grain; aquatic plants, etc., with an active choice of what it is going to eat, which is the reason why it sometimes covers considerable distances.

- 2 to 3 hours Sleep

The deep sleep stages occur in season with one of its legs resting. We may also identify the depth of its sleep by its posture: the deeper the sleep, the lower the neck and both lower lip and eye lids down. They need to be from 2 to 3 minutes a day lying down because it is only in that position that the paradoxical phase of sleep can occur. This phase of sleep is extremely important from the metabolic point of view, because it acts as neurological protection. If a horse cannot lie down it presents what is known as sleep deprivation, and in this way, when horses are being transported during many hours, or when carrying out sportive activities or are held in boxes that are smaller than 9 square meters where they refuse to lie down, we would be affecting the physiological recuperation of their nervous systems. On the other hand, they may present a compensatory sleep by increasing the hours of sleep on the days following a great effort or sleep deprivation.

- 2 hours Moving Around

Horses naturally move around every day, which they do in a coordinated manner and in groups.

- 5 to 6 hours Rest

When in a wakeful state, the horse alternates between moments of no physical activity with other activities.

By evaluating this administration of its time and comparing it to what the daily life of the stabled horse is, we come up with a clear reality: the horse is necessarily immersed within a system that will put all its adaptation capacities to the test. This is not the only point that justifies the appearance of behavioral disorders in this type of management. On the other hand, a strategy that is frequently used in the treatment and prevention of the stereotypes (involuntary and tempestuous repetition of gestures and actions) and stabling "vices" is to increase the amount of fiber in their rations as something more physiological for the species.

Social Behavior

In order to be able to observe social behavior in horses, these must avail themselves of a surface of not less than 500 hectares, otherwise their behavior is compressed when in areas below 300 hectares due to lack of space. This social behavior is complex; the functional unit is the family or harem made up of a stallion, a group of mares; foals up to a maximum age of 3 years, and maybe even other subordinate stallions within the same family; the average number of mares is 1.5 to 5.7 (Keiper 1986); these families are relatively stable.

After the age of 3 years, males leave the group of origin. Apart from what is known as "reproductive groups", we may observe other types of "non reproductive" groups made up of young males (few individuals, usually not more than 4) which are not very stable, and even groups of over 8 individuals, some of them young females with no stallion, and lastly, solitary males and in a lesser degree, solitary females. Stallions will try to form their own harem at the age of 5 or 6 years. Females may opt to join families that are already constituted. These non reproductive groups are there to uphold the individuals that are undergoing a process of maturity. Several of these groups (reproductive and non

reproductive) make up what is called the herd. There is a hierarchy within the group and also among those that make up the herd, so that the stallion is in charge of protecting the family and keeping it together, whilst the dominant mare will command all activities related to drink, food and transfers. These activities are not necessarily initiated by the dominant animals. By social disposition, one of lower hierarchy may take the initiative and the rest follow, although once the activity begins, the one with the highest hierarchy takes command. It is possible to observe families with two (or rarely more) stallions, where the subordinates cooperate with tasks of protection and unity of the group belonging to the dominant animal (Welsh 1975, Denniston 1980, Miller 1980, Berger 1986). These groups have shown themselves to be more stable than those with only one male (Miller 1980, Stevens 1990).

Equine social structure is far from being as rigid and strict as has been observed in social predators, whereby hierarchy may only be made apparent in unfavorable conditions from the environmental point of view, where it is necessary to manage scarce resources or eventually during strategies related to survival. We must always take into consideration that social structure is in favor of saving the global energy of the group, and therefore, in herbivores, where the need for complex activity in order to procure food, for example, is minor; there are less opportunities of putting it into practice. When conditions are peaceful, stallions take up a passive stance, and it is the dominant female that leads the group activities. This situation changes radically when there is danger or intrusion, in which case the stallion will intervene and defend its family.

The welfare and protection of developing foals is one of the objectives of these reproductive

groups, and all the individuals see to this. Frequently females on heat abandon their families in order to be serviced by an external stallion.

Horses display a tendency to keep together in pairs under rural conditions, which reproduces what occurs in a natural environment: there is a "prime companion" with which they carry out all their activities. This reciprocal attachment causes the individuals to calm down, and therefore, the lack of social contact to which the horse is exposed in certain types of management creates a potentially stressful situation, or at least, one in which managing environmental stimuli is affected by a lesser capacity to adapt.

Development of the Foal

Because they are not nidifugous (species that do not possess nests), foals are born with enough maturity to be able to move around with their mothers and group soon after birth. Thus, the stages of development of the equine are extremely rapid and short.

The post-natal period of the horse lasts approximately 2 hours. During the first minutes after birth a primary link of attachment is established between the mother and its foal and already it is possible to observe the protective behavior of the mother as well as a state of stress when she loses sight of her foal. It is important to avoid any stressful situations for the mother that may avoid or perturb this link from being correctly generated.

At the same time, the foal creates its own link with its mother (approximately 25 minutes after birth, together with the appearance of its binocular vision), which in nidicolous species (species with nests) is retarded until they open their eyes (for example, 10 to 15 days after birth in dogs). Their hearing is completely operative between 10 to 20 minutes after their sight appears.

Attachment is helped along from the chemi-

cal point of view by the adoption pheromones, which, when obtained synthetically, are used therapeutically or preventively in situations of stress in adult animals (E.A.P. Merial Laboratory).

As from the attachment, other learning will occur, as for example, discrimination of environmental stimuli; socialization; etc. So the better the quality of that attachment, the better the autonomy acquired by the foal to explore its environment, and also, the more stable and adapted the character of the mother, the better the adaptive capabilities of its offspring, since it will make all its learning related to the environment in which it will have to live as an adult, all the easier. The emotional state of the mother when she is confronted with a new stimulus for her foal shall be taken into account, and in this way it will learn how dangerous or not that stimulus is because of the mare's reaction.

The primary attachment link in mammals cannot be dissociated from imprinting (impregnation; specific marking) which is a long time learning that gives the individual the possibility of recognizing its own species, memorizing the characteristics of its mother. This is done within what is known as the critical period or sensitive period, in other words, we are in the presence of a kind of learning provided by a moment in particular in the development of the central nervous system during a limited space of time. Additionally, imprinting implies not only the specific marking, but also the filial and sexual marking, which is rarely observed as operative in the equine species as regards humans, except in cases of orphan foals raised in social isolation from their species.

At this stage we may put into context Dr. Miller's imprint training method from the point of view of the capabilities of the species. We are not dealing with a true imprinting, neither, from the

behavioral point of view, does the horse resist a double specific learning (as in the case of domestic carnivores like the dog). Essentially it is socialization that is provided or de-sensitivation to a potential predator—of man, for example—during a sensitive period. On the other hand, Miller also talks about de-sensitivation in his method, which causes even more confusion.

There has been no shortage of criticism as well as followers of this technique; numerous works have been published in support of, or showing adverse results. However, we must not be detrimental towards the merits that this work actually has, since it was the first to set forth the importance of early learning in horse management.

The Miller method presents a series of maneuvers that are stressful. This stress could hinder the primary attachment link between the foal and its mother. We may mention, for example, the introduction of the operator's fingers into the foal's natural orifices, considering that this could later facilitate future maneuvers. Comparative studies showed that there is no later benefit obtained in maneuvers such as deparasiting with a nasogastric tube in animals of up to 3 months, but instead, that after 3 months there is no difference between "impregnated" foals and others with a less invasive management of the individuals.

On the other hand, some investigators have described the appearance of aggressiveness towards man (through sensitivation) in foals subjected to this type of technique. During a second or third session, the idea is to manipulate the foal; make it go forward; backward; move sideways; bear weight on its back and put its head in a halter; but the duration is not explicit: an important factor considering that learning is at stake. From the ethological point of view, it is important to associate the mother to the maneuvers, because this calms the foal down

and avoids the stress resulting from loss of visual contact.

We must bear in mind that all brutal management may affect the adaptation capabilities of the foal, considering its future living conditions, above all in high-performance animals; management based on the foal's adapted behavioral development is an invaluable tool.

Stress and the Horse

When up against a stressful situation, the four possible reactions of an individual are:

- Fight
- Flight
- Faint
- Freeze

Of course the strategy that causes the equine species to calm down and the first that the horse will practice is flight, therefore, anything that implies a closed situation when faced with a stimulus in which the animal must adapt, will eventually put its capabilities regarding this to the test.

Stress in itself is physiological; it is usually found in a pathological sense, but this is not correct because when short and long term responses can't be overcome and it is not possible to achieve adaptation to the situation, we find ourselves facing distress or chronic stress, which is pathological.

By placing the concept more in context we could say that the environmental factors could be potentially stressful or muffling; this depends on the evaluation of the knowledge. It must be pointed out that in horse management, the fainting or freezing reactions could be misinterpreted as a tolerance of the animal to the situation, when what is really happening is that it is incapable of issuing a response.

In short, the horse is a species which we must get to know; take into account its capabilities and needs and in this way we may be able to

adapt its management in order to diminish adverse situations or prevent future behavioral problems.

Its characteristic as prey makes it very sensitive to suffering sensitivity processes that end up in pathological conditions such as phobias and anxieties which once they appear, must undergo treatments that may be long and costly.

For a long time individuals displaying above-average adaptation capabilities have been selected, but we do not know how many horses have been wrecked along the way through inadequate management.

Equine Welfare

A global tendency regarding what is known as Animal Welfare has existed for some time, which is an ethical-philosophical position with ethological and scientific foundations which started on the level of production animals as a result of pressure exerted originally by consumers. Later it was regulated and became extensive to all domestic species. Nowadays Animal Welfare is an EU export requirement (EU-25 and its amendments) for animal products.

Briefly, parameters presented for poultry are used by the Animal Welfare Council (1979, UK), known as the "Five Freedoms":

1. Freedom from hunger and thirst
2. Freedom from discomfort
3. Freedom from pain, injury or disease
4. Freedom to express normal behavior
5. Freedom from fear and distress

Observation or not of these needs is a parameter for assessing Animal Welfare. It is important to at least take them into account and put this issue on the table, since it is becoming increasingly important on an international level regarding everything related to animal management in general.