

AMERICAN QUARTER HORSES' BEHAVIORAL FORMS

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The review of basic literary sources is made out of behavior of horse. On the basis of the field researches (visual supervisions) after three different aged groups of mares it is built ethograms. An ethogram of behavioral forms among mares was developed. They represent the different forms of mares' behavior in a dynamics. The reaction of mares of the different age-related and physiology groups on appearance of extraneous objects on a pasture, their activity, hierarchy, socialization is analyzed in groups. Several main studies on equines were reviewed in ethogram. Four objects were placed into the pasture with the mares and foals including a mat, cone, halter, and mounting block. Initial interest of mares in objects was high. Herd mentality highly evident. When one horse spooked at object the whole herd followed. After 5 minutes, majority of mares and foals lose interest in objects. The major general behavior categories observed include: locomotion, comfort, and harem social. Dominance was demonstrated while looking at the objects. Dominance was also demonstrated when a mare wanted to be in a specific place or play with a specific toy, she would pin her ears back, bite, or kick at the other mare.

Keywords: *behavior categories, ethogram, open and pregnant mares, foal, American quarter horses, foals.*

Introduction

Equine behavior has historically been a topic of great interest to animal keepers, biologist, animal scientists, veterinary specialists, ethologists. Numerous descriptive accounts of equine behavior as well as a few studies focusing on particular species or types of behavior are available in the lay and scientific literature. A value of behavior, ability to provide for and manage it is the extraordinarily important condition of the proper care of animals, organizations of their feeding, conditions and training. Taking into account, that behavior of horse is the inherited sign it is possibility by a selection to create the animals of desirable type [4,11,12].

However, without regard to the considerable amount of scientific works in the world [1,2,5,6,7,8,9,10,12-14], some aspects of animals' behavior remain incomprehensible. Besides long time the study of domestic animals' behavior restrains temper technologies of maintenance with individual care by animals. That is why about the features of wild animals' behavior sometimes it is known more than about domestic.

The methods of behaviors' research are various. So in etiology the method of visual supervisions is widely used for description of behavior of animals in the wild maintenance. For the study of behavior of agricultural animals are worked methodical receptions for construction of ethograms. An ethogram is a formal description of a species behavioral repertoire or a major segment of it. This method allows to learn behavior of animals without interference with usual schedule of day and without violation of the functional and physiology state of animals [10-13].

Accumulated practical and theoretical material allowed some researchers to systematize separate data and classify the forms of animals' behavior. So A. Sloinim (it is cited after M.V. Zubetz [4]), distributed all behavior on 3 categories: reflexes on storage of internal environment of organism and constancy of metabolism, reflexes on the change of external environment of organism, reflexes which connected with maintenance of specie. Thembrok E., 1969 distributed all behavior on two basic groups: consumer and alarm actions. V. Velykganin, 1984 (it is cited after M.V. Zubetz [4]), worked out taxonomy of behavior of animals, which 5 subsystems (population (social), food, adaptive, locomotin, reproduction) are based into selection.

Classification is more generalized sometimes, for example, in relation to food behavior which includes drinking. Especially interesting for researchers behavioral forms were described more in detail, for example, agonizm [11,12].

Famous researcher of behavior of horse Ransom distributed behavioral action in the ethograms into 13 discrete categories which embrace the range of reactions, which horse can show on condition of free maintenance. They in turn can be easily generalized in more wide category.

McDonnel, 2003 [11] described the behavioral forms by figures. Using them could help easily differentiate the behavior of horses.

In general all behavioral forms consist of those which are life necessary (main) and directed on to the providing comfort (second-rate). To life necessary it is possible to take: feeding, locomotion, grooming, elimination, reproduction. To second-rate - socialization, herd instinct, watchfulness, comfort, playing, agonism.

Feeding behavior. Feeding behavior occupies half of the daily time budget of horses and usually entails grazing. Grazing occurs as a horse bites off and ingests grasses and forbs close to the ground. The feeding category also includes browsing on woody plants and trees, eating snow, drinking, mineral licking, coprophagy (eating feces), and pawing at food resources. The latter is critical in defining feeding as a mutually exclusive category in that a horse may be pawing at soil, plants, or snow, but if the action is directly related to acquiring and ingesting a food resource, then it should be considered as feeding behavior. Also, horses move as they graze; therefore, as long as the horse is feeding while it is moving, it should be considered as feeding rather than locomotion [13].

Rest. The second largest amount of time in the daily time budget of horses is allocated to resting, which may occur during 25–35 percent of the daylight hours. Resting behavior is characterized by a general lack of attention and relaxed state and may occur in a standing position or in recumbence. This includes both relaxation and sleeping.

Horses are able to sleep standing up due to the stay apparatus that allows their body to be supported without active muscular control (Dallaire, 1986). This behavior is typically observed as a body position with the head lowered, eyes closed, and one rear foot slightly elevated. Resting behavior in a band is often characterized by huddling, which facilitates insect control by the tail-swishing of close neighbors. Recumbent rest can be sternal or lateral. The comfort behavior of sun-basking is expressed in a laterally recumbent state, so a protocol must be defined a priori characterizing this state as rest or comfort, based on research objectives.

Locomotion. The third largest amount of the daily time budget is spent on locomotion. This behavior includes walking, trotting, cantering, galloping, jumping, and swimming and in feral horses is typically used for moving from one resource to another. Since most feral horse populations in North America occupy arid or semi-arid environments, movement to the few and scattered water sources is often the impetus for daily occurrences of extended locomotion (typically every 12 to 24 hrs). Otherwise, feral horses do not expend vast amounts of energy in locomotion, with the exceptions of brief social interactions between bands, stallion agonistic expressions, and female recruitment efforts by stallions. In this ethogram, locomotion integral to reproductive, harem tending, or comfort behaviors is considered part of its respective behavioral expression and not recorded as locomotion [3].

Grooming. Grooming behavior occupies a relatively small but important part of the daily time budget of feral horses and is often observed as rolling. Rolling occurs both on land and in water and is thought to assist with pelage health and insect control (Waring, 1983). Other grooming behaviors include shaking, nibbling or licking on self, tail-swishing, rubbing, and periodic stomping to displace flies and biting insects. Allogrooming (also known as mutual grooming) in this ethogram is not considered categorically as a grooming behavior since it is also a social interaction that involves more than one animal. Depending on the nature of the research, it may be appropriate to consider allogrooming as part of the grooming category [5].

Comfort. Comfort behavior takes on a wide variety of forms in feral horses and includes any type of self-enjoyment expression, such as play, investigation, and stimulation. Some examples of comfort behavior are sun-basking, shelter seeking, masturbation, sexual play, object play, locomotor play, play fighting, and some olfactory investigations. Olfactory investigations also may be indicative of reproductive behavior or social behavior and should be included in the appropriate category for data collection based on specific research objectives. This ethogram also includes yawning and stretching as comfort behaviors, though it would not be inappropriate to include those expressions as a form of resting behavior [10,11,14].

Standing Attentive. When horses receive a stimulus that causes alertness, they react by exhibiting a rigid body posture with head upright, ears pointed forward, and eyes open and alert. This may be momentary in the case of a sound or smell causing alertness, but such standing attentive behavior also occurs for extended periods of time when a female is standing guard over a sleeping foal or a predator is nearby. In this ethogram, standing attentive does not include instances when the behavior is a result of human presence. In those cases, human awareness is considered its own category so that the biased data may be properly addressed during analyses.

Elimination. Elimination in horses is expressed as urination or defecation, though depending on research objectives, it should be determined whether any such expression will be included in this category or whether elimination with social implications is considered elsewhere. Socially, feral horse stallions create fecal middens known as stud piles and repeatedly defecate on them. These middens are thought to facilitate communication or ownership status of certain resources (Feist and McCullough, 1976; Rubenstein and Hack, 1992). When female feral horses urinate or defecate, it is common for the harem stallion to cover it with his urine for similar reasons. It has been reported that female horses do not cover the urine of other females in this fashion (McDonnell, 2003), though this was documented periodically during our study and may have implications in the female dominance hierarchy.

Social. Harem social behavior is considered to be social interaction among band members that is not specifically indicative of reproductive, harem tending, or agonistic behavior. Allogrooming is considered a harem social behavior in this ethogram, as is olfactory investigation (from one horse to another, or the systematic smelling of urine deposits among band members) and pair-bonding among juveniles.

Herding. When a feral horse stallion actively drives females of his harem together, it is considered herding behavior. This involves the stallion moving systematically behind the females, posturing with his head held low and ears laid back, and controlling the direction and movement of the band members [9].

Waring (1983) termed this motion with the stallion's head moving side-to-side as snaking. Some researchers may choose to consider this as an agonistic behavior, but it is considered here as its own category since the function of the behavior is maintaining the harem rather than aggression toward specific females [1,2].

Harem tending. Harem tending consists of stallion behaviors that are directed at maintaining the harem and include the defense and recruitment of females. The defense of females is expressed as a stallion positioning himself between his harem females and a perceived threat (typically another stallion). It is also expressed by covering a female's urine or feces with his own, or by depositing feces on a stud pile. Recruitment, or stealing, of females by a harem stallion from another stallion is also considered harem tending behavior in this ethogram [4].

Reproduction. Reproductive behavior in feral horses is characterized by a series of stallion-initiated behaviors and a series of mare-initiated behaviors. The stallion reproductive sequence often (but not always) begins with herding or reproductive tending behavior. Reproductive tending is the close following of a female by the male, without the directional driving observed in herding behavior. Following this tending behavior, the stallion often vocalizes and exhibits the olfactory response known as flehmen. Female reproductive behavior is signified by estrous, which can sometimes be challenging to detect from typical field observation distances. A mare initiates her reproductive sequence by presenting herself facing away from the stallion, lifting her tail, and vocalizing (though sometimes the female faces the stallion first) [6].

Agonism. Agonism in feral horses is exhibited by a wide range of behaviors and in this ethogram is put into seven categories arranged by increasing intensity of the interaction. Note that any or all of the following behaviors may be exhibited in play by young animals, in which case they should be considered comfort behavior rather than agonism. The first four categories of agonism may occur between males only, females only, or between males and females, but the remaining levels of agonism are typically observed only between males.

1. The most common and least intense form of agonism is the threat. Threats are characterized by laterally pinned back ears, arched neck, and (or) a movement of the head toward the opposing horse, but with no physical contact. Most conflicts and dominance interactions among feral horses are resolved by these gestures alone.

2. The next agonistic expression is the bump or push, which is expressed by the aggressor making forceful contact with another horse using its head, neck, or shoulder.

3. As agonism escalates, the aggressor may chase its adversary at a gallop to displace the animal from the immediate area or with the intent of engaging the animal in more agonistic behavior. Chasing behavior is typically brief (seconds) or may last several minutes; however, the USGS study documented this behavior occasionally persisting over long time periods (greater than 1 hour) and great distances (greater than 3 km).

4. The fourth level of agonism involves biting an opponent or kicking with the hind legs. This level involves physical contact, though serious injury is rare.

5. Rearing occurs when the horse lifts its forelegs off the ground and elevates its body into a more vertical position, thus looking larger to the opponent. While technically only a threat, this body position typically signifies a more intense agonistic interaction and provides the initial position for commencement of stomping, striking, boxing, and dancing behaviors.

Materials and methods

The aim of our researches was analyze of behavior of mares of the different age-related and physiology groups their reaction on appearance of extraneous objects on a pasture, activity, hierarchy in groups, socialization. On the basis of the field researches (visual supervisions) after three different age-related groups of mares to define correlation of time which is conducted by mares after the different forms of behavior and to build ethogram, which could represent it.

Researches were conducted in March-April, 2015 on the base of the educational-experienced stable of the Agricultural college, of Pennsylvanian state university (USA). Researches consisted in the visual supervision by the mares of American quarter horse breed (n =70). All mares were divided on 3 groups: 2 year - olds mares (two year single mares), lactating mares with foals, mature (pregnant of and open mares older than 2 years).

We also supervised foals which were with mothers. Mares of the different age-related and physiology groups were on three separate pastures, by a general area in 40 hectare. Mares had a free access to water on a pasture, that provided by automatic drinking bowls with heating. After each of groups it was conducted for 7 supervisions. Every supervision lasted 30 minutes. For visual supervisions we used the atlas of behavior of horse (McDonnel, 2003), by means of which we differentiated forms of behavior of horse and their reaction on extraneous objects on a pasture.

Each of 5 minutes behavior of horse was fixed in protocol of supervisions. After a supervision given from protocol about every animal it was individually treated by Exel. The next stage was grouping of data for studying of rhythms of functional activity in average on the groups of animals. At the same time we have studied reaction of horse for unknown objects, which where placed on a pasture. In general on pastures with three experimental groups of mares were placed grey tarpaulin tarp, plastic cone of rich orange colour, dark blue mounting block and halter. Behavioral models are based on watching 7 mares with foals which were on a pasture. Foals were in age from 2 weeks to month.

Results and discussion

In the first part of experiment we were interested by the behavioral reactions of mares of three groups and foals on appearance in pasture of unknown for them objects.

Two-year olds mares behavior in relation to foreign objects. Overall the 2-year olds were curious for the objects that were added to the field, and also "squabbled" with each other by pinning their ears, biting, and kicking each other. Some were more willing to investigate than others. They approached the entire object (tarp, block, and cone) first tended to be more timid and remained in the back of the herd. With the objects all of the horses were attentive to them. Ears pointed straight at foreign object, eyes forward. Nostrils large and flaring, snorting. When one horse jumped or spooked all of the others would react as well. The tarp was feared whereas the block and cone were playful objects. Once the horses became less afraid of objects dominance hierarchy of the herd could be seen. The bold horses appeared at the top.

After the tarp was placed in the field, all of horses cautiously approached it. After a few seconds, the wind slightly blew the tarp which sent all of the horses turning and running away. The leader approached the tarp a second time and the other 2 year olds followed his lead. Different behaviors were observed while they were at the tarp such as kicking, sniffing and running.

The mounting block also drew a lot of attention. The horses pawed at the block and when they knocked it over they would run away from it.

The horses seemed to enjoy playing with the traffic cone. They would pick it up, carry it and swing it around.

Not much attention was paid towards the halter. Didn't seem to have an effect on the behavior of the horses.

The major general behavior categories observed in 2 year olds include: locomotion, comfort, and harem social.

When the tarp, traffic cone, and mounting block were placed in the paddock, the behaviors exhibited included: sniffing, biting, pawing at, and flipping over the mounting block. Picking up the traffic cone and tossing it around the paddock. Dominance was demonstrated while looking at the objects.

Lactating mare and foal behavior in relation to foreign objects. The behavior of 7 mares and 7 foals was observed for a period of 30 minutes. After each minute the type of behavior being exhibited was recorded. Behavioral patterns observed and recorded are based on a group of seven mares with their foals in a pasture. The foals range in age from 2 weeks old to 1 month old.

In general, the foals followed the mares lead when approaching new objects. The mares and foals were especially interested in the mat placed in the field. One mare took initiative and was biting and pawing the mat. Some foals stood on the mat for an extended period of time. The mares became braver the longer we observed them. The mares and foals approached and started interacting with the "foreign" objects placed in the field. The first behavior demonstrated was all the mares came galloping down the hill to investigate the tarp. The mares were very aware of the movement of the tarp, by ducking their heads down, along with blowing and snorting at the tarp. A mounting block was then added to the pasture. This distracted some of the mares from the tarp. As soon as something would move or make a sound the mares would run a small circle then become alert again. Dominance was also demonstrated when a mare wanted to be in a specific place or play with a specific toy, she would pin her ears back, bite, or kick at the other mare.

When the mounting block, scale cover, and halters were placed in the pasture, the following behaviors were observed: snorting, sniffing, and circling mounting block. Pawing, nibbling, and licking scale cover investigating halters, including picking them up in their mouth and swinging them around dominance observed when mares and foals were playing with the scale cover.

Initial interest in objects was high. Foals that were wandering all moved back to their mother's side. Spooking, snorting, and approaching behaviors. Herd mentality highly evident. When one horse spooked at object the whole herd followed. After about 5 minutes, majority of mares and foals lose interest in objects. One mare showed a greater interest in the mat and spent approximately 5 minutes biting, nuzzling, and pawing at the mat. During this time period her foal wandered from her side, pinning of the ears at other mares as a sign of aggression and dominance. There was an evident hierarchy among the mares, while watching how they approach each other. Mares and foals are excited by the activity of the open mares running in the next pasture over. They move over to the fence and foals move back to their mothers sides reacting to the action in the other pasture. Besides brief moments of excitement they are relatively inactive during this time period and spend a lot of time standing. Pawing and chewing on foreign objects as a means to investigate.

Pregnant of and open mares' behavior in relation to foreign objects. These mares spent most of their time behaving in a uniform fashion. The mares chewed and licked the block and ran from the tarp. The pregnant mares were more curious than the open mares. Some of the mares that were at the other end of the field showed excitement when they saw the objects placed in the field. They immediately ran toward the area of the field where the new objects were placed which exhibited the horses' natural curiosity toward new things. Some mares showed an excellent example of a horses' flight response when she spooked at the tarp and in turn caused the other mares to spook, none of the mares would go within 10 feet of the tarp. The mares were very intrigued with the mounting block. Sniffing and turning it upside down. Observed interactions between the mares jumping up on hind legs, rearing pinning ears and nipping at each others vocalization.

Open mares showed more individuality and did not contact closely with each other as a two years mare. They had less curiosity to the plastic objects. Halter escaped a notice for mares in general.

Among these mares also there was noted hierarchy and to the objects the most bold mares befitted the first.

Some mares showed special delight from new objects on a pasture and demonstrated curiosity to them. Mares were very interested by mounting block, sniffed around and felt it by noses.

Prevailing was shown by the desire of alfa-female to appear in some determined location or play with some concrete objects. She showed agonistic behavior: pinned back ears, biting and beating back.

After fixing reaction of each of the groups on new objects, we passed to the second part of experiment – visual watching behavioral forms. In each of groups it was conducted for 7 simultaneous supervisions. In general, one supervision lasted 60 min. Every group was supervised 630 minutes.

During the indicated time of supervisions in average on the group of 2 years old mares got next results. In relation to ethograms food behavior occupies 28% of all time visual supervisions, 27% is grooming, 22% was locomotion, 12% – social, 9% was behavior of comfort (inclusive playing), 2% was rest.

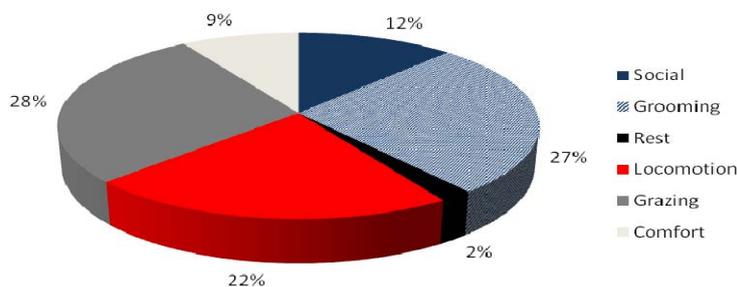


Fig.1. Two years old mares' behavior

The mares spent the majority of the time engaged in grazing. This corresponds to feral horses, which spend about half of their daylight hours feeding (Ransom, 2009). Tended to stay in close proximity to one another when there was an unknown object, threat – then spread out as they became comfortable were very observant of their environment. They were organized in a harem social. One mare led the herd to graze and also monitored who was allowed to play with objects while she was at the object. She was always the first to investigate something new exhibited varying personalities.

Various behaviors including social, play, maintenance, locomotion, resting, and feeding were monitored over a 30 minute time span. An ethogram was created to display the percent of time each mare spent performing the individual activities. The pie chart below is a culmination of the behaviors of the 5 mares as a herd.

For lactating mares some other results were got. Most protracted was food behavior, it is occupied up to 73% time of visual supervisions. Other time (27%) almost equally was distributed between behavior of grooming and locomotion (10-12%), rest and social behavior (2-3%) (Figure 2).

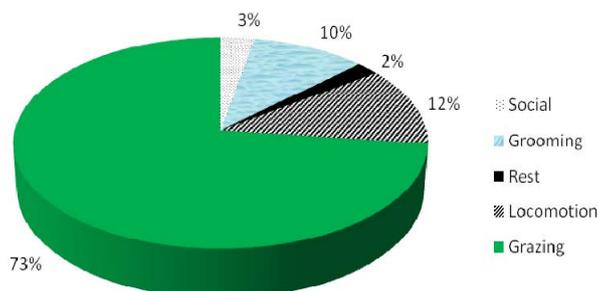


Fig.2. Lactated mares' behavior

In general, the foals copied the behavior of their mothers. The foals were especially curious when new objects were placed into the pasture. The foals often engaged in pair bonding. Foals exhibited more social behaviors. They would wait for the mares to investigate new objects before approaching them.

For foals which were in a group with mothers food behavior was 30%. Thus 18% was on grazing and 12% on suckling. Behavior of grooming unlike all mature mares for foals occupied only 1,5%. The foals moved 20% of time. On socialization it was spent up 25% time. Foals had a rest most long time comparatively with other groups - 22%. In general on behavior of comfort, inclusive playing it was spent 1,5% (Figure 3).

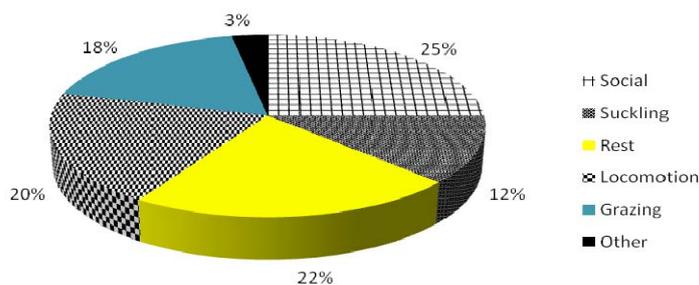


Fig.3. Foals' behavior

For an open mares most protracted period was grooming – 40%. Open and pregnant mares showed a high requirement in socialization, and their social behavior attained 25% of all time of visual supervisions. Locomotion behavior laid down to 21% of daylight hours, and food behavior only – 14%. In this group mares did not have a rest and did not play during visual supervisions.

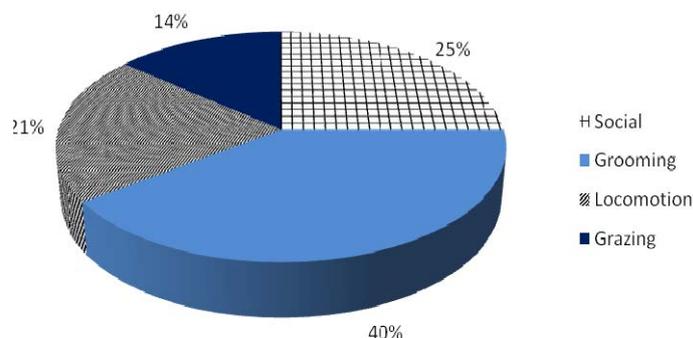


Fig.4. Pregnant of and open mares' behavior

Thus duration of food behavior in the different age-related and physiology groups of mares considerably hesitates (14-73%) and prevails in behavior of lactating mares. Behavior of grooming hesitates from 1,5 to 40% and marked as most prolonged in the group of open mares.

Locomotion behavior was most consolidated on duration laid down to 20-22% time of visual supervisions in all groups except for lactating mares (12%). It is marked that lactating mares the least need socialization. High this necessity is in open mares and foals. While mares with foals showed greater individuality in a counterbalance to the expressed herd instinct of other experimental groups. Behavior of comfort was supervised in two years old mares and foals. It laid down 1,5-9% of daylight hours.

All horse had a rest except for open mares. Part of rest laid down 2-22% daylight time. Foals required rest the most.

Conclusions

1. Two years old mares show a high personal interest to the new objects.
2. Lactating mares are the least curious and interested in new objects.
3. Foals follow after behavior of mothers in search all new and unknown objects.
4. In general curiosity to the new objects for a horse does not last longer, than 5-15 min.
5. Lactating mares are grazing the longest part of daylight hours. They want greater individuality and show it in the behavioral forms.
6. Open mares the most part of daylight hours spend in grooming and socialization.
7. Two years mares spend in feeding and locomotion a half of daylight hours. There is 21% for playing and social activity.
8. Foals spend equal time of daylight hours in moving and having a rest. Most of the time they have food behavior.

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