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BIOMETRY AND BEHAVIOR OF EQUINES IN THE CENTRAL AMAZON

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ABSTRACT

Equine therapy is a therapeutic activity that uses the horse as its main instrument. To carry out this activity, the horse must meet biometric and behavioral criteria to be considered fit. Despite its widespread use as an assisted therapy, there are few studies on the biometric and behavioral analyses of horses undergoing equine therapy. This study aims to analyze the behavioral and biometric profiles of horses that work at the Equotherapy Center of the Military Police of the State of Amazonas. Biometric measurements and behavioral analyses were conducted on four adult horses that participated exclusively in equine therapy. 8 linear measurements were measured: withers height (WH), croup height (CH), codilho height (CoH), body length (BL), neck length (NL), dorso-lumbar length (DLL), scapula length (SL) and head length (HL). For behavioral analysis, tests were conducted using playful objects. Regarding biometric measurement, the average values were: WH: 1.47 cm; CH: 1.50 cm; CoH: 90.25 cm; BL: 63.25 cm; NL: 87 cm; DLL: 48.75 cm; SL: 57 cm; HL: 1.285 cm. In turn, in the behavioral test, in general, the horses maintained their mental state. It is concluded that the horses evaluated are in good biometric and behavioral condition for equine therapy, and that the present study provides a comparative basis for horses in the Amazon region when considering equine therapy.

Keywords: therapy, measurement, assessment, horses.

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1. INTRODUCTION

The use of animals in rehabilitation therapy has increased significantly, with experts recognizing the importance of the bond formed between humans and animals (ARAÚJO, 2014). Thus, equine therapy, a physiotherapeutic and educational method that uses the equine as its modality, supports the physical, psychological, and motor development of individuals with or without special needs. The horse used in treatment must also achieve postural, cognitive, and affective goals according to the practitioner's needs (MAJEWSKI, 2021).

Equine therapy requires whole-body engagement, supporting the practitioner's development of muscle strength, relaxation, body awareness, and motor coordination and balance. This is due to the horse's kinesiotherapeutic movement, which, with each stride, involuntarily forces the practitioner to move in three directions: up and down, side to side, and forward and backward (ANDE, 2016; MELO, 2020). It is known that the horse has three natural gaits – walk, trot, and gallop.

Because of its regularity, equine therapy sessions are conducted at a walk, which produces a sequence of simultaneous movements that helps the practitioner adjust posture and balance. The walk is characterized by a symmetrical, marching, rocking gait with four beats, in which the limbs rise and fall in the same order (ARAÚJO, 2014). According to Majewski (2021), therapy horses should be selected according to the correct gait, compatible withers height, and temperament. It is essential to identify the horse's psychological responses to environmental stimuli, which reflect its sensitivity and excitability, and to understand its gaits better to elucidate its movement dynamics.

Horses are used in various activities, whether for leisure, sport, or work. Therefore, for each purpose, the horse must possess a specific conformation and meet biometric standards to improve its performance in the activity to which it is subjected. According to Severo (2019), each purpose requires neuromotor coordination between all parts of the horse for the reproduction of movement, in which linear and angular dimensions contribute to the quality of the gait. This study aims to analyse the behavioral and biometric profile of horses used in Equine Therapy at the Equine Therapy Center of the Military Police of Amazonas.

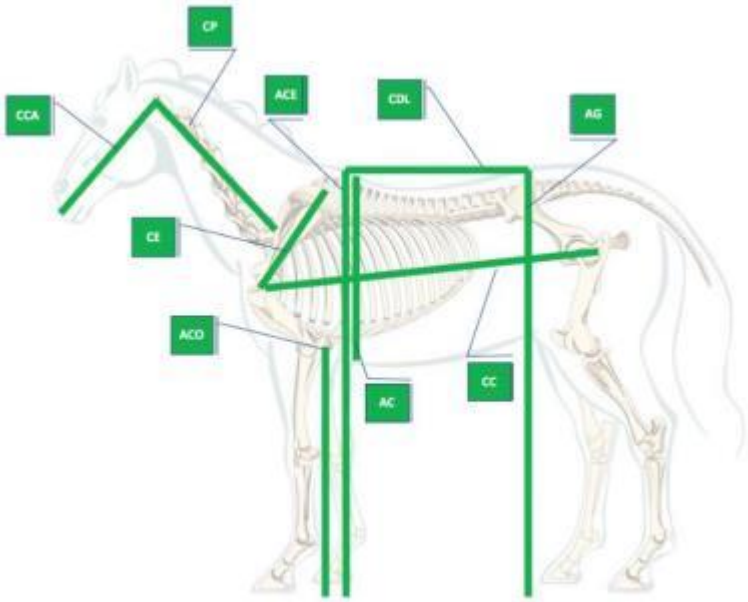
2. MATERIALS AND METHODS

This study is quantitative and exploratory. According to Raupp (2006), exploratory research seeks to understand, in greater depth, preliminary concepts about a given theme that have not been addressed in a satisfactory and precise manner. In turn, the quantitative approach is used in studies that seek to identify and classify relationships between variables and to establish causal relationships between phenomena.

This study was conducted in the field, at the Equine Therapy Center of the Military Police of Amazonas – Mounted Police Regiment (RPMON) – Colonel Bentes, in the Cavalry, located in the central-west zone of Manaus, Amazonas. Founded in 1992, the Equine Therapy Center is offered free of charge to the public and assists, serving more than 100 children, with or without special needs. Morphometric measurements and behavioral analysis were performed on four horses, two males and two females, adults, aged four years or older, crossbred, used exclusively for equine therapy. Among the animals, three started the activities recently, approximately one year ago. Finally, one of the horses is a veteran, having been practicing equine therapy for more than three years. Equine therapy is practiced in two shifts: morning and afternoon. The animals perform the activity in the morning from 7:30 am to 10:30 am, using three horses. In the afternoon, the activities start from 1:10 pm to 4:00 pm, using only one horse.

The morphometric measurements were taken using a measuring tape, with the subject in a forced standing position, the right lateral view, and the limbs perpendicular to the flat ground, without any unevenness. The aim is to establish a standard, thereby allowing all evaluated horses to be compared and enabling accurate assessment of limb angles (VICENTE, 2023). The animals were restrained solely with the halter to ensure proper positioning on a straight plane aligned with the ground and to obtain reliable results. Eight linear measurements were analyzed: Withers height (ACE), Croup height (AG), Elbow height (ACO), Body length (CP), Back-loin length (CDL), Scapula length (CE), Head length (CCA), and Body length (CC) (Figure 1) (VIEIRA, 2020).

Figure 1 - Representation of the biometric measurement of linear measurements.



Source: the authors

To explore and analyze equine behavior, play objects were used, namely, objects intended to enhance the practitioner's development with the horse concomitantly. According to McDonald (2017), the best option for analyzing equine reactivity is to use items present in the therapy environment. Therefore, the selected objects were those routinely used in practice.

In the behavioral analysis process, possible situations that the equine would encounter without exhibiting overt responses, with its mental state preserved, were simulated, such as moving objects, objects in contact with the animal's rump, and noise from objects. It should be noted that the therapy environment is a Police Regiment, where practices are conducted throughout the barracks; therefore, there are several non-therapy-related stimuli, such as sirens, a patrol-departure carousel, and shouting. Given this, horses must be prepared and desensitized to environmental stimuli.

Initially, the behavioral analysis was carried out by directing the animals to the riding arena, a familiar and controlled environment. The horses were passively restrained in a halter, with light restraint applied throughout the test to prevent erroneous results

from abrupt restraint and to avoid interference with the animals' natural responses to the object. The behavioral test was conducted individually; each play object was exposed to all animals for 60 seconds, during which movements, touch, and other behaviors were recorded.

The horses' activity with the play objects was analyzed according to the Behaviorally Defined Adjectives (BDA), translated into Portuguese as Adjectives Definidos Behaviour (LLOYD et al., 2007), where they were determined in 3 categories: excitability, anxiety and curiosity, scaled from 1-3, with 1 being low activity and 3 being high activity. Anxiety is defined as the horse's fear of the object, excitability as the horse's level of activity in relation to the object, and finally, curiosity as the horse's interest in the object.

The collected data were recorded, tabulated, and summarized. For the biometric measurements, the average value for each measurement was presented in a table, along with the standard deviation, maximum, and minimum, yielding results expressed as the average ± standard deviation. The behavioral profile was presented graphically, and an individual behavioral analysis was conducted for each play object.

3. RESULTS AND DISCUSSION

The morphometric measurements were tabulated in Table 1. The behavioral analysis performed during the test with play objects is shown in Figures 1, 2, and 3. Analysis of the graphs indicates that only one horse had a grade of 3 for anxiety and excitability (Figure 1). When exposed to the bottle-cap play object, it is worth noting that the horse analyzed is one of the animals recently acquired, which may explain its observed resistance to the object.

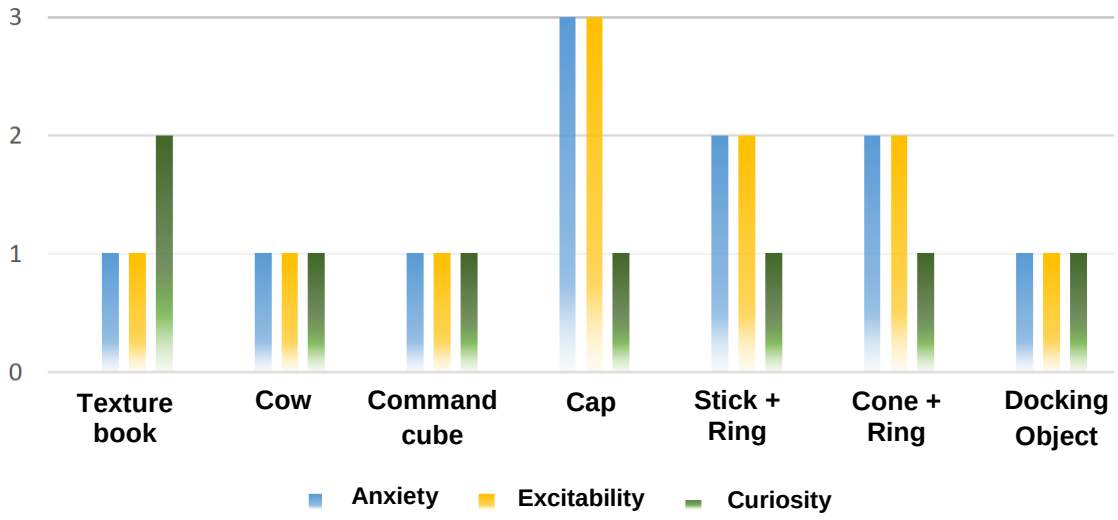
Regarding the adjective referring to curiosity, horse B showed higher curiosity than the other animals when exposed to play objects, including a texture book, bottle caps, and a control cube. The analysis of horse C also indicated a favourable level of curiosity, a reliable behavioral indicator that the animal is comfortable and stable in the presence of an object.

Table 1 – Biometric values (in centimeters) of horses used in Equine Therapy by the Cavalry of Manaus, Amazonas.

Variables	Average	Standard deviation	Minimum	Maximum
ACE	1.47	0.002	1.44	1.50
AG	1.50	0.002	1.46	1.52
ACO	90.25	172.20	80.00	98.00
CP	63.25	456.30	49.00	79.00
CDL	87.00	137.30	80.00	95.00

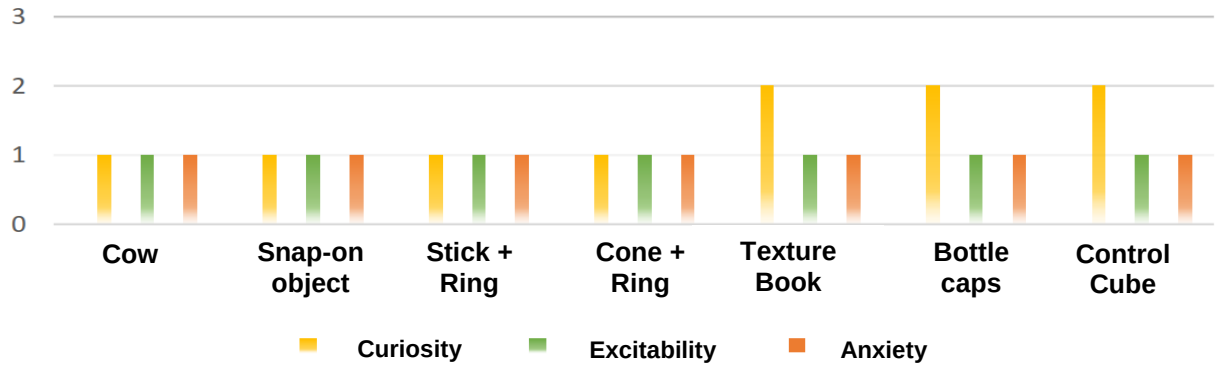
Source: the authors

Figure 1 – Behavioral analysis of the equine A.



Source: the authors

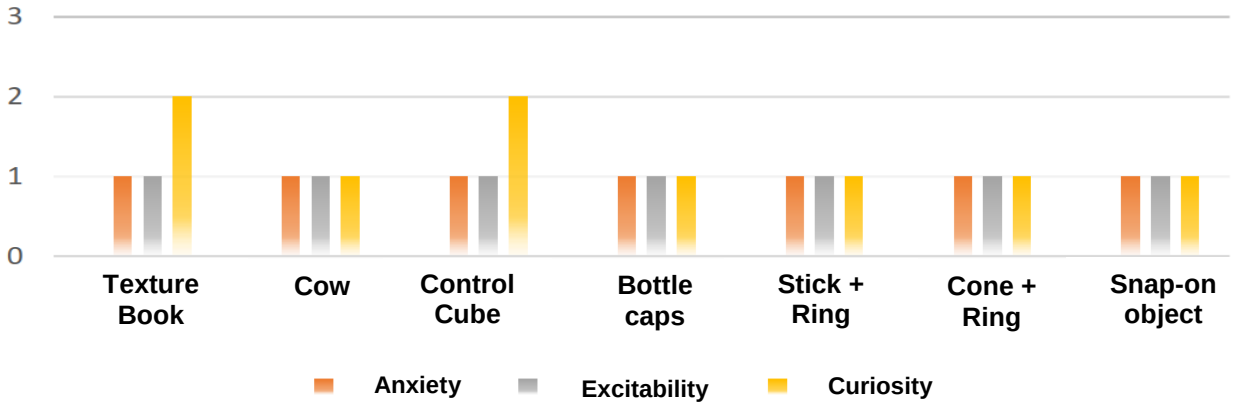
Figure 2 – Behavioral analysis of the equine B.



Source: the authors

Throughout the relationship between horse and man, conformation was used to predict equine performance and health. In this context, morphometry or biometrics aims to study the body measurements of animals, in which size, shape and proportions of body structures influence biomechanics, as they are intrinsically related to the animal's function (FONSECA, 2018; SEVERO, 2019).

Figure 3 – Behavioral analysis of the equine C.



Source: the authors

Equines with adequate body proportions will show better performance in the development of the activity for which they are intended. Therefore, the aim should be to balance, compensate for, and harmonize body measurements to achieve functional quality in animals (SANTIAGO et al., 2014; DA SILVA, 2020). The average ACE (Height at Withers) of the horses used in Equine Therapy at the Manaus Cavalry was 1.47 ± 0.002 cm, which is within the range proposed by the National Association of Equine Therapy (ANDE-BRASIL), which recommends therapy horses with a height of 1.40 to 1.50 cm at ACE (HORNE, 2005).

According to Almeida (2022), in equine therapy, the preference is for medium- to small-sized animals to facilitate the therapist's access to the participant at each step. The findings of the present study were superior to those reported by Andrade (2018) and Almeida (2022), who reported ACE values of 145.9 ± 4.96 cm and 138.8 cm, respectively. All three studies align with the determination by ANDE-BRASIL.

The average height of the croup (AG) was 1.50 ± 0.0024 cm. This study shows differences in measurements by sex, with the AG of males higher than that of females. As pointed out by Lôbo (2016), the ideal height of the withers is to have a ratio of 1:1 to the height of the croup, because if the height of the croup is greater than the height of the withers, it will overload the thoracic limbs, and if the opposite occurs, the pelvic limbs will be overloaded. However, as observed by Da Silva (2020), the small variation can be explained by the fact that the anatomical point used to measure wither height is influenced by the spinous process of the thoracic vertebrae.

Shorter scapular length may indicate reduced range of motion and impact absorption in the thoracic limbs, especially if associated with less thoracic depth, while greater length indicates better performance of the thoracic limbs (LÔBO, 2016). In this study, the average scapular length was 48.75 ± 474.8 cm, which is greater than the value reported in Lôbo study (2016), where the CE was 42.36 cm. However, it was shorter than the value reported in Vieira study (2020), which reported an average CE of 54.34 ± 0.88 cm. Neck length contributes to functional performance, as the neck musculature is directly related to the action of the thoracic limbs.

Furthermore, during locomotion, the neck reestablishes balance during oscillations of the center of mass. A long neck is justified to balance the body, because movement is transmitted by the posterior region; if the neck is shorter, the amplitude of movement and the ability to reestablish the center of mass decrease (LÔBO, 2016). In the present study, the average neck length (CP) was 63.25 ± 456.3 cm, which is greater than that reported by Lôbo (2016) and Vieira (2020), who found values of 43.04 cm and 57.12 cm, respectively.

A short and proportional head constitutes quality and aesthetic beauty, especially when linked to a long neck, since it is easy to move and relieves the thoracic limbs (MENESES, 2015). According to studies by Pimentel (2016), for saddle horses, it is desirable that the head be relatively small or short and well joined to the neck. In this study, the CCA was measured at an average of 57cm ± 142.2 cm, which is higher than the value reported by Lôbo (2016), who measured head length at 52.81 cm. However, in comparison with Vieira (2020), who reported a head length of 63.7 cm, the average in the present study was lower.

The average CDL (back-loin length) in this study was higher than in Vieira's (2020) study. As noted by De Castro (2018), animals with longer backsloins are important for performing double riding, when the rider lacks the balance to remain alone on the saddle. As demonstrated by Lôbo (2016), it is recommended that animals suitable for riding maintain a 1:1 ratio of body length to withers height. In this study, this proportionality was compromised, with an average body length (BL) of 1.285 ± 0.07 cm and an average ACE (Area of the Arm and Neck) of 1.47 ± 0.002 cm, which was higher than the BL. However, the estimated weight of the horses is >500 kg, which may allow a balance between the ACE and BL ratios, as described in studies by ANDE (2014), Santiago et al. (2014), and Meneses (2015). Elbow height (ACO) is an important measurement in horses, as it reflects the size of the forelimbs and indicates whether the animal has short or long limbs. However, biometric studies using this measurement are difficult to find. This can be explained by the fact that it is a very similar measurement to the substernal void, the latter being an important index and ultimately preferred by researchers (CHUNG, 2017). The average ACO in the study was 90.25 ± 172.2 cm, higher than the value reported by Vieira (2020), who observed an average ACO of 83.13 cm.

Therapeutic horses should be selected according to their correct gait, compatible withers height, and temperament. It is well known that identifying the horse's psychological responses to stimuli in its environment is important, as it reflects its sensitivity and excitability and underscores the need to better understand its gaits to elucidate its movement dynamics (ANDE, 2018).

The best option for adaptation reactivity tests is for each individual location to use items already present in that therapy program environment. (MCDONALD, 2017). According to Feitosa (2014), the ideal horse should enjoy human proximity and demonstrate ease of learning and concentration during activities. It is also important that it is neither afraid nor anxious about the movements around it and that it tolerates changes in sound, direction, and scenery. It cannot be easily startled, be ticklish, or exhibit olfactory and auditory hypersensitivity, as these characteristics hinder therapy and can cause accidents. Given that equine behavior is influenced by human behavior, the reciprocity of horse-human interactions and the trainer's role in shaping a horse's behavior should be considered central to behavioral analysis in training (HOGG, 2020).

During the behavioral test, the horses, for the most part, exhibited a preserved mental state when exposed to the movement and approach of objects. Corroborating the study, Feitosa (2014) highlights the importance of bringing the animal closer to play materials so that it adapts to the objects used in the sessions without fear, without thinking that they are things that may cause it pain, and accepts them naturally, since it will already be accustomed to that particular situation and will possibly not exhibit anomalous behavior.

Given that external stimuli occur at all times, knowing that it is a military environment, where horses need to deal with sirens, car movement, alarms and the like. Anderson (1999) strongly recommends that annual desensitization training be administered to ensure a safe environment for riders and practitioners.

4. CONCLUSION

After analyzing the biometric and behavioral tests using play objects, it was concluded that the therapy horses at the Military Police Equine Therapy Center are in accordance with ANDE-Brasil recommendations, with a safe withers height for the practitioner and the team. Regarding the horses' behavior, in general, there was no mental alteration attributable to actions performed during the behavioral test; this result indicates that the likelihood of incidents during equine therapy is low.

It is worth noting that few studies have examined the ideal conformation of equine therapy horses; therefore, there is a need for more research on this topic to ensure that equine therapy practice continues to evolve and be updated, as the horse is a primary instrument of its success.

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