

Feeding and activity time location preferences of horses in a paddock area

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ABSTRACT

This study aimed to investigate the areas where horses spend the most time in a paddock area, and the time they spend on certain behaviors in an outdoor paddock environment during summer. Four horses were used in the study, and the data were collected between 09:00-16:00 for 12 days through video recording (a total of 84 h recording). Of the available locations, the horses spent 32.54% of the time in the pasture, 25.06% at the water bucket, 22.63% at the hay rack, 17.26% with the other horse, and 2.51% at the entrance gate. In terms of feeding and activity, they spent 43.24% of the day standing, 27.91% eating (pasture), 19.38% eating (hay rack), 5.74% walking, 3.39% drinking, 0.32% in other activities, and 0.02% running. From the examination of the times of the day when the horses were at the different locations in the paddock, it was found that they spent more time in the hay rack area between 09:00-10:00, in the pasture area between 10:00-12:00 and 14:00-15:00, and in the water bucket area between 12:00-14:00 and 15:00-16:00. As for the times of feeding and other activities, they spent more time eating from the hay rack between 09:00-10:00, eating in the pasture between 10:00-11:00, and standing between 11:00-16:00. According to these results, of their different activities the horses spent the most time in the pasture area and also more time feeding.

Key words: behavior assessment; horse welfare; location choice; paddock; time budget

Introduction

A paddock is generally referred to as a place where horses can roam freely in an enclosed outside area. Horses can run, walk, feed, and engage in various activities in these areas. In short, these areas are the places where horses can change location more freely and have fun, rather than in their stalls (YILDIRIM, 2020).

As a guideline, there should be at least 330 m² of paddock area per horse, and no paddock should

be less than 800 m² when only used for turnout. In order to supply enough grass, pastures need to be much larger (EU PLATFORM ON ANIMAL WELFARE, 2020). From the recommendations of different countries for paddock size we found that Swedish experts suggest that an individual paddock should be at least 300 m² (VENTORP and MICHANEK, 1995), and Danes recommend 800 m² and also that horses should be kept together

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in social groups (SØNDERGAARD et al., 2002). However, there is little evidence to show that these individual paddock sizes are sufficient for exercise and other activities (JØRGENSEN and BØE, 2007).

Restricting animals in specific spatial areas may cause restrictions in their expression of their behavior and thus harm their welfare (DAWKINS, 1988; DIXON et al., 2010). Horses are usually housed in single stalls in a stable. Recent studies show that this situation harms the welfare of horses, and that horses need a certain amount of time for free movement (CLEMENCE et al., 2020).

Horses are extremely sensitive to environmental stress. Depending on the breed, horses generally need to be housed in environmental conditions between 5-27 °C air temperature and 30-70% relative humidity (OZBEYAZ and AKCAPINAR, 2010). However, horses can also be found in climates where temperatures can drop to -40 °C or rise as high as 40 °C (MARLIN, 2020).

When previous studies (YAKAN et al., 2012; AUTIO and HEISKANEN, 2005) are examined, horses in paddock areas spend most of their daily time feeding, so it may be thought that the time spent in the eating and drinking areas is the longest part of the day. The study by HARRIS et al. (2006) showed that horses fed hay and grain spend much less time chewing compared to horses on pasture. Also, horses like to use the area around the entrance gate as a resting or gathering area, rather than only for entering and exiting (EVANS, 2000), therefore they spend part of the day in this area. It is recommended that horses should be in complete physical contact with other horses in a paddock, pasture, or group shelter, for at least part of the day. This makes it possible for young horses to socialize, learn to read the signals of other horses, and to develop some social behavior patterns (THOMPSON and CLARKSON 2019; EU PLATFORM ON ANIMAL WELFARE, 2020). Therefore, observing the behavior of horses in a paddock area can contribute significantly to the development of ideas and opinions about their management (YAKAN et al., 2012).

The feeding behavior of feral horses occupies roughly half of the daily time and generally involves

grazing. The second largest amount of their daily time is spent resting, and accounts for about 25-35 percent of their daytime. The third largest amount of time in the day of feral horses is allocated to locomotion (jumping, trotting, walking, galloping, cantering, swimming, etc.). Grooming behavior, which takes up a small portion of the daily time of feral horses, can often be observed as rolling (RANSOM and CADE, 2009).

It can be difficult to develop a research ethogram from several hundred behavioral patterns, therefore, it is recommended to study more basic behavior in horses (RANSOM and CADE, 2009). Although many people have described the behavior of horses, the statements by MCDONNELL (2003) are among the most ideal. The ethogram resource by WARING (1983) on horse behavior is more comprehensive.

This study aimed to investigate the areas (focusing on the water bucket, hay rack, entrance gate, pasture, and another horse) where horses spend the most time in the paddock, and the time of day that horses use for certain behaviors in the paddock areas. It also aimed to observe how the behavior of horses changes at different periods, temperatures and humidity levels during the day.

Materials and methods

To carry out the study, no permits or ethical committee approvals were required since the horses were not disturbed or subject to any exercise during the assessment. The study was carried out between 09:00 and 16:00 h in two outdoor paddock areas surrounded by fences. The animals stayed for 7 hours (09:00-16:00 h) per day in the paddock and then went back to their stalls. Each paddock had an area of about 20 x 40 m², and the paddocks had no protection from the sun or other inclement weather. The evaluation of horses from two different breeds placed side by side in the paddock areas provided equivalent environmental factors, making the rate of exposure to environmental factors similar. During the 12-day study period, each paddock was tested 12 times for each breed (2 horses x 6 days), or 24 times for the total of two breeds. The horses were placed in each paddock along with one other horse, either a Thoroughbred or a Haflinger.

Horses. Two Thoroughbred horses (2 geldings) and 2 Haflinger horses (2 mares) with a mean age of 10 years (range 6-18 years) were observed. Their average body weight was calculated as 485.62 ± 20 kg for the Haflingers and 493.36 ± 20 kg for the Thoroughbred horses. The observers and the horses' riders assessed whether the horses were healthy and in good condition. A daily diet was provided of 1-2 kg roughage and 0.5-1 kg concentrated feed per 100 kg body weight and the horses were allowed to graze in the paddock. Their daily diet was provided in the same way, no additional food was given and the horses were not subjected to exercise throughout the study. Both horse breeds (Thoroughbred and Haflinger) used in the study are included in the cultural breeds group of warm-blooded horse breeds with an interesting temperament (OZBEYAZ and AKCAPINAR, 2010). Therefore, when evaluating the research results, no breed discrimination was made.

Camera and recording system. The horses were viewed by means of a video camera (Haikon, Copyright Hikvision Digital Technology Co., Ltd., Hangzhou, China) in the paddocks from a distance of about 24 meters. The video camera was connected to a digital video recorder (Hikvision,

Copyright Hikvision Digital Technology Co., Ltd., Hangzhou, China) set to record for 7 hours between 09:00 - 16:00 h throughout the experiment (12 days).

Temperature and relative humidity. This research was carried out in the city of Erzurum in eastern Turkey. The city is among the coldest provinces in the country. It stands at an altitude of about 1850 m, and the summer periods are hot and dry, with temperatures up to 36 °C at times. The meteorology institution (Meteorology 12th Regional Directorate, Yakutiye, Erzurum, Turkey) located near the study area (Yakutiye, Erzurum, Turkey) was used for the weather condition data used in the study. The weather conditions obtained from this institute were received hourly eight times a day from 09:00 to 16:00 h. The average of the first and last hour data was evaluated as the temperature and relative humidity values of the 7-hour interval observed in the study. Also, the maximum and minimum temperatures and relative humidity of the hour intervals observed were determined (Table 1). The average temperature during the research period (July) was 28.57 °C and relative humidity was 22.69%.

Table 1. Weather conditions during the observational hours throughout the 12-day study (Temperature - °C, Humidity - %)

Variable		09:00-10:00	10:00-11:00	11:00-12:00	12:00-13:00	13:00-14:00	14:00-15:00	15:00-16:00
Maximum	°C	31.40	33.40	34.25	34.45	33.70	32.35	30.55
	%	44.50	40.00	37.50	35.50	34.00	33.50	37.50
Minimum	°C	23.75	24.75	26.65	25.20	25.20	25.75	25.85
	%	14.50	13.00	11.00	11.00	11.50	13.00	16.00
Overall average	°C	27.49	28.63	29.20	29.38	29.15	28.69	27.43
	%	27.54	24.58	22.33	21.08	20.33	20.42	22.54

Observations. The behavior of the horses was observed for 12 days in July 2019. One observation day lasted for 7 hours (total 84 h). The location of the horses (paddock) was noted, along with the behavior performed precisely for each time

slot. The behaviours considered in the study were location area used, feeding and activity, and these were classified in more detail (Table 2). The areas where the horses were observed in the paddock and their measurements are shown in Fig. 1.

Table 2. Definition of locations and behaviors recorded during observations

Behavior	Observation
Location areas	It only refers to the time spent by horses in location areas (Eating, drinking, or activities are not considered in this section)
Water bucket	Time spent in the water bucket area
Hay rack	Time spent in the hay rack area
Entrance gate	Time spent in the entrance gate area
Pasture	Time spent in the pasture area
With the other horse	Time spent with the other horse area
Feeding and Activity	Eating, drinking, or activities are considered in this section
Eating (hay rack)	Feeding on the hay rack
Eating (pasture)	Feeding on pasture
Drinking	Water drinking from a bucket
Standing	Standing, standing alert, sniffing, resting, huddling (no feeding, locomotion)
Walking	Walking
Running	Trotting, galloping
Other activities	Chewing-kicking water bucket, lying down, mutual grooming, Rolling

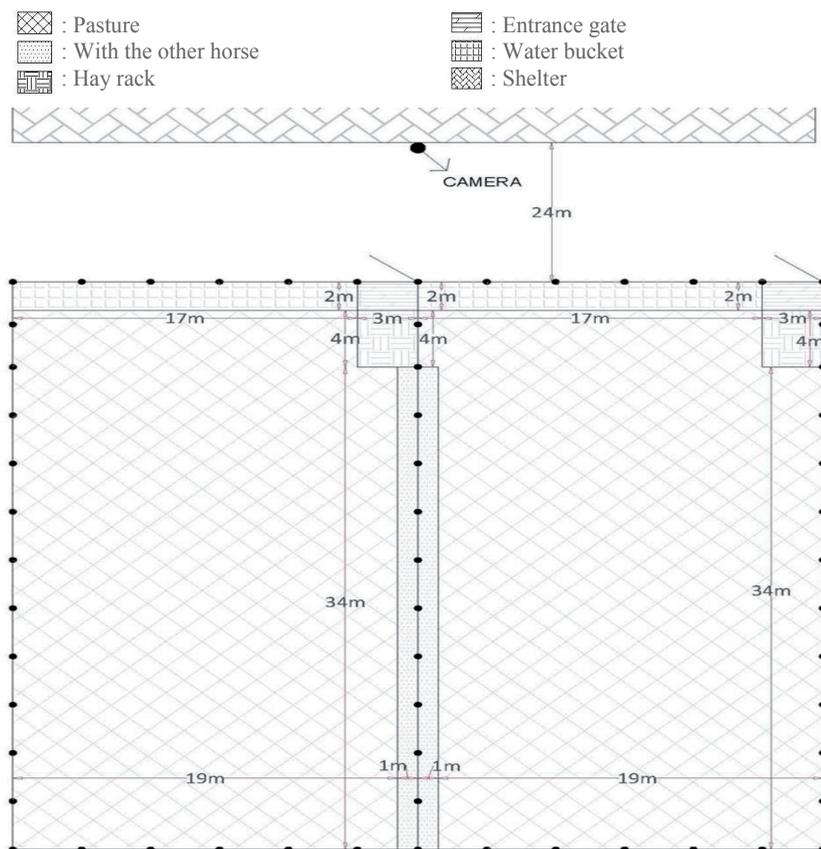


Fig. 1. Observed areas in the paddock

Statistical Analysis. The research data monitored from the camera recordings were taken by the minute. These data were then converted to percentages, and calculations were made. The mean value and the standard error were calculated as the percentage of total observations for each location area and behavior. The Friedman test (FRIEDMAN, 1937) is a nonparametric statistical test of multiple group measures. The data used in the study were found to be non-parametric, therefore, the significance of the differences between the groups (length of time) in this study was made using the

Friedman test. The Wilcoxon Signed Rank Test is a nonparametric test for analysis of matched pair data, based on differences (WOOLSON, 2007). For this reason, the significance of the differences between length of time and the general averages was found by the Wilcoxon Signed-Rank Test.

Results

The observations of the locations, feeding and activities of the horses in the time slots determined by the study are presented in Table 3.

Table 3. Observations of location areas, feeding and activities in the time budgets of horses (Means \pm SE)

Location areas	Time Budgets							p	Overall average
	09:00-10:00	10:00-11:00	11:00-12:00	12:00-13:00	13:00-14:00	14:00-15:00	15:00-16:00		
	Percentage of observations/84 h								
Water bucket	6.18 $\pm 1.79^b$	9.86 $\pm 2.51^b$	24.03 $\pm 5.46^b$	30.35 $\pm 6.59^a$	32.36 $\pm 6.72^a$	30.76 $\pm 6.30^a$	41.88 $\pm 9.57^a$	0.002	25.06 ± 4.19
Hay rack	51.74 $\pm 3.86^a$	36.32 $\pm 4.35^a$	19.65 $\pm 4.21^b$	16.25 $\pm 3.98^b$	12.57 $\pm 2.50^b$	11.53 $\pm 2.82^b$	10.35 $\pm 2.62^b$	0.000	22.63 ± 1.05
Entrance gate	1.04 ± 0.50	2.85 ± 1.10	3.54 ± 1.40	3.26 ± 1.14	2.85 ± 1.33	2.85 ± 0.80	1.18 ± 0.42	0.331	2.51 ± 0.47
Pasture	38.26 ± 3.53	39.86 ± 4.98	29.72 ± 4.43	27.08 ± 4.59	29.03 ± 6.31	36.94 ± 8.06	26.87 ± 6.63	0.190	32.54 ± 2.67
With the other horse	2.78 $\pm 1.99^b$	11.11 $\pm 4.44^b$	23.06 $\pm 8.20^a$	23.06 $\pm 5.50^a$	23.19 $\pm 5.18^a$	17.92 $\pm 4.51^a$	19.72 $\pm 6.87^a$	0.007	17.26 ± 3.64
Feeding and Activity									
Eating (hay rack)	48.40 $\pm 3.74^a$	32.56 $\pm 4.12^a$	16.11 $\pm 3.76^b$	9.72 $\pm 1.92^b$	10.28 $\pm 2.16^b$	9.93 $\pm 2.43^b$	8.68 $\pm 2.56^b$	0.000	19.38 ± 1.36
Eating (pasture)	34.86 $\pm 3.04^a$	35.00 $\pm 4.39^a$	24.44 $\pm 4.10^b$	20.97 $\pm 3.27^b$	24.38 $\pm 5.85^b$	33.19 $\pm 7.54^a$	22.50 $\pm 6.63^b$	0.030	27.91 ± 2.23
Drinking	3.19 ± 0.54	3.13 ± 0.25	3.82 ± 0.49	4.72 ± 0.52	3.26 ± 0.43	2.99 ± 0.43	2.64 ± 0.39	0.085	3.39 ± 0.14
Standing	10.63 $\pm 2.06^b$	25.42 $\pm 4.16^b$	51.32 $\pm 5.50^a$	58.76 $\pm 4.39^a$	56.45 $\pm 5.25^a$	45.14 $\pm 6.91^a$	54.93 $\pm 5.78^a$	0.000	43.24 ± 2.59
Walking	2.85 $\pm 0.68^b$	2.99 $\pm 0.64^b$	4.10 $\pm 0.85^b$	4.93 $\pm 0.80^b$	5.63 $\pm 1.15^b$	8.68 $\pm 3.09^a$	11.04 $\pm 3.40^a$	0.039	5.74 ± 1.06
Running	0.07 ± 0.07	0.07 ± 0.07	0.00 ± 0.00	0.423	0.02 ± 0.02				
Other activities	0.00 ± 0.00	0.83 ± 0.83	0.21 ± 0.15	0.90 ± 0.59	0.00 ± 0.00	0.07 ± 0.07	0.21 ± 0.10	0.254	0.32 ± 0.19

P: The Significant of Friedman Test (Among the significant ($P < 0.05$) ones from the Friedman Test, the Wilcoxon Signed Ranks Test was used between the overall average and each time budgets.); a: Based on positive ranks, b: Based on negative ranks (The different letters (a,b) in the same row indicate ranks between the groups)

Observations in the paddock area according to location. In this study, in terms of overall average times in the different locations, the horses spent about 32.54% of the time in the pasture area, 25.06% in the water bucket area, 22.63% in the hay rack area, 17.26% with the other horse and 2.51% in the entrance gate area. The values for the locations were analyzed terms of proportion, and significant differences were found between the data for the water bucket ($P=0.002$), hay rack ($P=0.000$) and being near the other horse ($P=0.007$). However, the differences for other areas (entrance gate, pasture areas) were insignificant ($P>0.05$). In other words, the horses were found in these areas in similar percentages of the time. From the comparison of each length of time and the overall average data of the differences that were considered to be statistically significant, it was found that the horses spent more time in the water bucket area between 12:00-16:00 h, in the hay rack area between 09:00-11:00 h and in the area with the other horse between 11:00-16:00 h. Also, when the data within the time slots were evaluated, it was observed that they spent more time in the hay rack area from 09:00-10:00 h, in the pasture area from 10:00-12:00 and 14:00-15:00 h, and in the water bucket area from 12:00-14:00 and 15:00-16:00 h. In addition, especially at noon, the horses spent more time near the other horse and the entrance gate.

Considering the results of the location area data in general, it was found that the horses went to the hay rack area in the mornings, and the water bucket and near the other horse at noon and in the afternoons. In addition, the horses occupied the pasture area and the entrance gate area in particular, without any particular frequency at any specific time of day.

Observations in the paddock area according to feeding and activity. The feeding and activities of the horses in terms of the overall average time indicated that the time the horses spent standing, eating (pasture), eating (hay rack), walking, drinking, in other activities, and running were in approximately the following percentages: 43.24, 27.91, 19.38, 5.74, 3.39, 0.32, 0.02, respectively.

The data relating to feeding and other activities were analyzed in relation to time, and significant

differences were found between the data on eating from the hay rack ($P=0.000$), pasture grazing ($P=0.030$), standing ($P=0.000$) and walking ($P=0.039$). However, the differences between feeding and other activities (drinking, running, other activities) were insignificant ($P>0.05$). In other words, the horses engaged in feeding and activities in similar percentages in all time slots. The comparison of each time slot and the overall average data relating to the differences that were considered to be statistically significant, showed that the horses spent more time eating from the hay rack between 09:00-11:00 h, grazing in the pasture between 09:00-11:00, 14:00-15:00 h, standing between 11:00-16:00 h and walking between 14:00-16:00 h. Also, when the data on the time slots used for feeding and other activities are evaluated, the most time was spent by the horses eating from the hay rack from 09:00-10:00 h, grazing in the pasture from 10:00-11:00 h, and standing from 11:00-16:00 h.

The results on feeding and other activities of the horses show that the horses spent most of their time standing, and it was observed that eating times were more intense in the morning hours. Also, there was more running activity in the morning than at other times. The activities of standing, drinking, and other activities were found more at noon, between 12:00 and 13:00 h, than at other times, and this hour was the time when the temperature was the highest (29.38 °C) and the humidity was the lowest (21.08%). Walking activity increased towards the evening hours. In addition, it was determined that chewing and kicking the water buckets, which are among the "other activities", were more frequent between 12:00 and 13:00 h when the ambient temperature was the highest, than at other times. The behaviours of lying down and rolling were more common between 15:00 and 16:00 h. On the other hand, mutual grooming was more intense between 10:00-13:00 and 15:00-16:00 h.

Considering the results of the feeding and activities data in general, it was observed that the horses go to eat in the morning, spend time standing at noon and in the afternoon, and walk about in the late afternoon. In addition, the horses spend time drinking, running, and in other activities, without any particular intensity at specific times of the day.

Discussion

The overall average results of use of the locations in this present study show that the horses spent the most time in the pasture area of all the paddock areas. When the sizes of the paddock areas are examined, in Fig. 1, the pasture area is the largest area compared to the other areas, so the time spent by the horses in the pasture may be higher than the other area values.

The results of feeding and other activities by the horses show that the horses spend most of their time standing. However, when we evaluated eating (hay rack or pasture) and drinking together, it was observed that horses spent more time feeding than standing. As some other researchers have stated (AUTIO and HEISKANEN, 2005; RANSOM and CADE, 2009; RANSOM et al., 2010; YAKAN et al., 2012), similar to this study, horses devote a large part of their daily time to feeding. This may explain why horses spend a large amount of time in the pasture area. In addition, the result showing that the horses preferred to feed in the morning hours in this study is similar to the research results of YAKAN et al. (2012).

Water consumption may vary due to many factors (YILDIRIM and YILDIZ, 2020). One of these factors, the daily rise in temperature, increases the daily water consumption substantially (PAGAN et al., 2017). In this study, the second-highest amount of time spent by the horses in a location in the paddock area was near the water buckets. This is thought to be due to the fact that the research was conducted in the summer period and the high air temperatures.

Young horses learn from each other and develop social behavior (EU PLATFORM ON ANIMAL WELFARE, 2020). The location area value relating to being near the other horse, shown in Table 3, was not found to be very high when the overall average results were examined. The ages of the horses in this study were between 6-18 years, which is adult age. The fact that horses of adult age were used in the study may be seen as the reason why they did not move from side to side very much.

The study by EVANS (2000) stated that horses like to use the area around an entrance gate as a resting or gathering area, but in this research, it

was observed that the horses did not spend much time in the location near the entrance gate. This difference was thought to be due to the effect of their hereditary temperament (AKCAPINAR and OZBEYAZ, 1999).

The thermoneutral zone is given as 5 °C to 27 °C for Thoroughbred horses (CYMBALUK and CHRISTISON, 1990), which were the breed of horses used in this research. The fact that the horses ran about in the paddock area less may be because the temperatures exceeded the thermoneutral zone of this breed. However, thermoneutrality has not been fully defined for all horses, as season, region, breed and age can change the absolute values of thermoneutrality (CYMBALUK and CHRISTISON, 1990).

The two most common forms of forage for horses are pasture and hay. Horses should feed at the same time each day. Otherwise, the horses may display bad eating habits such as eating too fast or refuse feeding (EVANS, 2000). In the present study, the hay racks were filled with dried roughage before the horses were brought to the paddock areas from their stalls each morning. Therefore, after the horses were taken to the pasture areas (09:00 h), it was considered natural that their time spent at the hay rack and eating from the hay rack would be higher than the other values (09:00-10:00 h). In the later hours (10:00-11:00 h), it is thought that the horses were in the pasture area because the roughage in the hay rack area had gone and they went to search for forage.

The activities and behavior of horses slow down at a certain ambient temperature (CYMBALUK and CHRISTISON, 1990). According to the results shown in Table 3, no running by the horses was observed after 11:00 h, since the temperature values increased at a certain rate after this hour. This increase in temperature might have prevented the horses from running.

In the hours when the temperature increases at noon (12:00 to 14:00 h), the horses' need for water increases, and so the horses spend more time in the near area the water buckets. CYMBALUK and CHRISTISON (1990) reported that horses' water consumption could increase in high environmental temperatures. The water intake by

horses may increase by 15% to 20% when the ambient temperature increases from 13 °C to 25 °C (CARLSON and OCEN,1979). According to the results of the temperature values in the midday hours in this study, the highest temperature (29.38 °C) was observed between 12:00 and 13:00 h, and the highest water consumption was observed as 4.72% in these hours.

In this study, the feeding activities (eating from hay rack or pasture and drinking) of the horses were replaced from 11:00 to 16:00 h by a large proportion of standing time. Towards the evening hours (15:00-16:00 h), when they left the paddock, the horses tended to go to the water buckets. The places where the water buckets were located were the closest to the shelters of all the areas in the paddock. A covered shelter can provide better protection because it becomes more difficult for insects to visually locate the horses, and horses are protected from the sun in the shade under a shelter structure (HARTMANN et al., 2015). Therefore, horses moved to be near the buckets towards the evening hours, and this was seen as a sign of their desire to go to their shelters.

When the other activities performed by the horses were evaluated according to the time allocated (09:00-16:00 h), it was found that the horses spent time chewing or kicking the water bucket during the hours when the temperature was high, and rolling and lying during the hours when the air temperature was slightly lower. In this case, it may be said that the air temperature greatly affects the horses' behavior. In addition, horses enjoy mutual grooming, and they also groom themselves (EVANS, 2000). Mutual grooming movements in the present study were observed at almost all hours of the day. This may be seen as a sign that horses enjoy mutual grooming. In other words, it can be said that mutual grooming by horses is less affected by temperature than other activities.

Conclusions

According to the overall average results of this study, it was observed that the horses spent time in different locations in the paddock area, but they spent the most time in the pasture area. In addition, it was determined that they preferred to spend

time in the hay-rack area in the early hours of their time in the paddock, and near the water bucket in the later hours (especially at noon when the air temperature increased). When the time horses spent on feeding and other activities during the day was examined, standing was observed most, but when all the feeding activities were considered (eating from the hay rack or pasture, and drinking), it was observed that the horses spent more time feeding than standing. Horses also performed mutual grooming for most of the day. As a result, the location, feeding and activities of horses in a paddock may vary depending on the time of the day. Therefore, conducting studies including more horses and longer periods of time can help us better understand the paddock behaviour of horses.

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SAŽETAK

Cilj rada bio je istražiti mjesta u koralu na kojima konji provode najviše vremena, posebno s obzirom na trajanje aktivnosti u otvorenom dijelu korala za vrijeme ljeta. U istraživanje su uključena četiri konja, a podaci su prikupljeni od 9 do 16 sati tijekom 12 dana videosnimanjem (ukupno 84 sata videomaterijala). Uzevši u obzir raspoložive prostore korala, konji su proveli 32,54 % vremena na pašnjaku, 25,54 % vremena uz pojilice, 22,63 % uz hranilice sa sijenom, 17,26 % s drugim konjima i 2,51 % vremena na ulaznim vratima korala. U pogledu hranjenja i tjelesnih aktivnosti proveli su 43,24 % vremena u danu stojeći, 27,91 % vremena hraneći se na pašnjaku, 19,38 % hraneći se sijenom s hranilica, 5,74 % u hodu, 3,39 % napajajući se, 0,32 % u drugim aktivnostima i 0,02 % u trčanju. Uzevši u obzir doba dana u kojem konji borave na određenom mjestu korala, uočeno je da su uz hranilice za sijeno najčešće bili od 9 do 10 sati, na pašnjaku od 10 do 12 te od 14 do 15, a uz pojilice od 12 do 14 te od 15 do 16 sati. Sagledavajući vremensko trajanje hranjenja i tjelesnih aktivnosti, konji su više vremena proveli hraneći se sa hranilice sijenom od 9 do 10 sati, na pašnjaku od 10 do 11 i stojeći od 11 do 16 sati. Rezultati pokazuju da konji najviše vremena provode na pašnjačkom dijelu korala, a od aktivnosti najdulje vremena provedu hraneći se.

Ključne riječi: procjena ponašanja; dobrobit konja; izbor mjesta boravka; koral; utrošak vremena
