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**THE DAILY ACTIVITY OF BEECH MARTES
(*MARTES FOINA ERXLEBEN*, 1777) IN DIFFERENT PARTS
OF THE «KACHAGHAKABERD» NATIONAL PARK**

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Summary

The work presents the peculiarities of the activity of the beech martens of «Kachaghakaberd» National Park in the territories of Martakert, Askeran, Shahumyan and Kashatagh regions of Artsakh in 2002-2020. The observations carried out by us showed that there are no marked deviations within the area. However, deviations are recorded at different times of the day and in different seasons of the year. Studies show that the beech martens are mostly active during dusk and night; however they may also be active during the mornings and throughout the day. Higher activity is observed during daylight hours in spring, which is due to the spring mating of animals and in winter, which, in our opinion, is due to the compensation of low activity because of the night frosts. Changes in the nature of the activity of these beasts are conditioned by large predators, climatic and anthropogenic factors.

As a result of the observations we found out that in summer at the temperature of +33 - +35 oC and in winter at the temperature of -15 - -22 oC their activity is lost. In summer they are more frequently encountered when the temperature is +23 - +25 0C, meanwhile in winter, they are encountered if the temperature is not below -8 - -130C. One of the factors affecting the activity of Beech martens is the stress, resulted from the economic activities, that sometimes causes extinction.

Keywords: *«Kachaghakaberd» National Park, area, beech martens, population, activity, climate*

Introduction. The fauna of Artsakh is rich and diverse. The most noticeable members of the fauna are mammals with their species composition, lifestyle and

ecological features. This was, of course, facilitated by the temperate climate of Artsakh, the diversity of landscapes, etc. However, the fauna of mammals is not fully studied which is conditioned by their hidden lifestyle, by their habitats which are hard to reach or inaccessible [1]. This, in turn, complicates the observations of their behavior in natural systems. The observations of those species active during the dusk and night hours are especially hard. Among such species are beech martens. This type of behavior and ecology are poorly studied in Artsakh Republic. These beasts are of special interest for studies due to their general, fundamental and practical nature. As a consequence of the social and spatial composition changes of the populations of this species at different parts of the area and of the group life absence, beech martens are a model object for the studies of predator mammals. The practical nature is conditioned by the protection of the beech martens which are relatively rarely encountered in our fauna and have a narrow area. The majority of the beech marten populations we studied lead a dusk or night lifestyle, but there are some exceptions [2]. The activity of beech martens is mainly described by the frequency of the encounters of animals in residential areas. A full observation of the daily activity and factors of beech martens in the habitats is possible due to the usage of light detectors [3]. The aim of this work is to examine the activity of beech martens in populations located at different parts of «Kachaghakaberd» National Park [4-6].

Materials and methods. The collection of materials was carried out in 2 stages: from 2002 to 2018 in Martakert, Askeran, Shahumyan and Kashatagh regions of Artsakh and from 2018 to 2020 at different parts of “Kachaghakaberd” National Park established in the same regions.

“Kachaghakaberd” National Park is based on state property lands in administrative borders of the rural communities of Askeran, Martakert and Kashatagh regions. It has an area of 67728.2168 ha. The terrain of the national park is hard.

49.7% of the national park consists of forest area. Due to the great contrasts of the national park terrain the climate is pretty diverse. The climate in national park is temperate typical for foothill and high hill zones climate. The average January temperature is -6 - -8°C, and the average July temperature is 16 - 18°C. Annual precipitation is 900-1100 mm and more. The maximum precipitation is in May - June, the minimum is in December.

The temperate climate develops in the height of 2400m mountain slopes and plains in the national park. Climate seasons coincide with the calendar ones. The winters are cold lasting 3-4 months, relatively damp, with constant snow. The thickness of snow layers is 5-30 cm, in the regions full of snow it can reach up to 40-45 cm. The average temperature is -2 - -8°C in January, the complete minimum can reach up to -15 – 20°C. Spring is mild, summer is hot, reasonably damp, with clear weather. The average temperature in July- August is 20°C, maximum of 28-30°C. Autumn is warm, with the prevalence of weather without rainfalls.

The frosts last up to 80-110 days. The number of yearly rainfalls is 900-1100 mm, sometimes even more. The landscape is covered with forests and forest steppes, the zone of temperate climate is favorable for recreational purposes and health resorts.

Large fluctuations in altitude, different slopes, and extremely fragmented terrain have endowed the national park area with an exceptional variety of natural conditions. To determine the activity of breech martens, we used 25 light detectors (Victure, HC 200 and Leaf River DC-3BU model), which we installed in the dwellings. We collected the data from them every 15 days and whenever necessary, made transfers of the light detectors.

From 2002 to 2009 in the territory of «Kachaghakaberd» National Park the observations were made by the classical methods accepted in zoology, and from 2009 until today, we have used light detectors. 6648 light detectors were processed per day, more than 955 pictures of breech martens were received, 3875 registrations were singled out. During one registration we used the photos on which it was possible to clearly identify the species. We analyzed the daily activity of breech martens in the settlements on the basis of received data. Later we calculated the number recorded at different times of the day (morning, noon, evening, night). Statistical processing of the data obtained during the study was carried out using the STATISTICA 6.0 software package (StatSoft, USA).

Research results. According to the observations carried out in different years at different parts of “Kachaghakaberd” National Park there were no differences recorded in the daily activity of breech martens thus the data analysis of different years have been combined. As a result of the observations we have discovered that breech martens can be seen during different times of the day in the territory of the national park.

However unbelievable this might seem, these beasts have more preferable times for themselves and they have a higher frequency of being seen at these times. Based on our recorded data 61% falls for the night time, 10% is during the day time,

22% is during twilight and 5-6% take place in the early morning.

As you can see from the table, these beasts are not active from December to February during the night time and day

time, which is most likely conditioned by the night and morning frosts (-15 - -20 0C).

During the day time from July to August the absence of activity is explained by the heat (+33 - +350C)

Table 1. The hours of Breech marten activity according to the months of the year and times of the day

Time of the day	Months of the year											
	01	02	03	04	05	06	07	08	09	10	11	12
00.00	-	-	+	+	+	+	+	+	+	+	+	-
02.00	-	-	+	+	+	+	+	+	+	+	+	-
04.00	-	-	+	+	+	+	+	+	+	+	+	+
06.00	-	-	+	+	+	+	+	+	+	+	+	+
08.00	+	+	+	+	+	+	+	+	+	+	+	+
10.00	+	+	+	+	+	+	+	+	+	+	+	+
12.00	+	+	+	+	+	-	-	-	-	+	+	+
14.00	+	+	+	+	+	-	-	-	-	+	+	+
16.00	+	+	+	+	+	-	-	-	-	+	+	+
18.00	+	+	+	+	+	+	+	+	+	+	+	+
20.00	+	+	+	+	+	+	+	+	+	+	+	+
22.00	+	+	+	+	+	+	+	+	+	+	+	+
00.00	-	-	+	+	+	+	+	+	+	+	+	-

Note: '+' - can be encountered; '-' - cannot be encountered

It should be noted that the breech martens sometimes leave their shelters during the day time and search for food. This is based on the data collected from the light detectors located on the trails.

So the daily activity of breech martens is distributed unevenly. Several peaks of breech martens' daily activity can be differentiated. From January to February, the peak for them starts at 8.00 in the morning continues until 18.00, after which the activity gradually fades. In spring they have a mixed distribution of activity, it is impossible to single out the peak here. Apparently, such activity is maintained in the fall. In summer they have two peaks: morning and dusk. In all months of the year the activity is registered in the period from 18.00 to 22.00. The recording of these beasts in the habitats at dusk suggests that the breech martens in the national park may return to their habitats or move to other temporary shelters while searching for food.

During different seasons changes in the activity of breech martens can be noticed in "Kachaghakaberd" National park (picture 1). According to the observations we made and the data collected from the light detectors it is apparent that in spring they are recorded more frequently during the night (80%) and evening time (40%). In our opinion this is conditioned by the mild climate and rich nutrition during pregnancy period. During the abovementioned period they can rarely be seen during the day time, but if seen, they are usually in deep forests where there is no side stress. In the beginning of summer they are active in morning hours as well (25% of the recorded animals), 15% were recorded in the afternoon, 40% was recorded in the evening and 60% were recorded at the night. Unlike summer, in autumn the number of morning and night recordings declines, instead, the number of evening recordings increases, especially in late autumn when the night frosts occur and in parallel the

activity of food objects decreases. In winter the number of morning, evening and night recordings decreases, instead the noon activity increases. Throughout the year, the activity of breech martens remains unchanged at dusk. Due to the increase in

daylight hours, the frequency of daytime recordings decreases, for example, in spring it is 25% of registered animals, in summer and autumn - 15%. The winter season is different, when 40% of the animals are registered during the daylight hour.

Picture 1. The daily activity of breech martens

Discussion. Along the whole area the breech martens are mainly active during dusk and night. However, as we can see from our observations conducted in “Kachaghakaberd” national park, they may also be active during the daytime. The studies show that breech martens can be encountered anytime during the day, but the nature of the frequency of encounters changes at different parts of “Kachaghakaberd” national park.

At the places of the park which are near inhabited areas they are mainly active during dusk and night time. They can even enter the hencoops and kill a large number of hens despite danger. Based on the observations made in the different communities of Kashatagh, Shahumyan,

Martakert and Askeran regions about 55% of the activity of breech martens recorded in late spring and summer consists of the night time activity, in autumn it comprises 45-48% and in winter – 35-40% (picture 2)

In uninhabited places with no stress causing factors the activity type of these beasts changes and it is recorded more frequently in the daylight hours. (picture 3)

Picture 3 shows that in uninhabited parts of the national park 25% of late spring and summer recordings are in morning hours, 40% - in the afternoon, 45% – in the evening and 50% - at night. At the compared locations the number of dusk recordings is nearly the same (at inhabited lands – 47%, at uninhabited lands – 45%). We record large deviations in the areas

under discussion in the morning and in the afternoon (respectively 38%, 25% и 9%, 40%). In our opinion, some of the factors that usually determine the daily activity of breech martens are the weather conditions, the influence of humans and large predators.

In our conditions, the lynxes is one of the main enemies of breech martens in wooded areas, in glades it is the wolf, sometimes badgers are food competitors. However throughout the national park observations the lynxes were recorded only three times. We did not find any traces of wolves or

pictures of them from the light detectors. The rarity of such facts does not allow us to speculate on the impact of predators on the daily activity of breech martens. It is mentioned many times in the registers of the National Park about the daytime meetings of the breech martens. Being quite agile, the animals can quickly hide in crevices or climb trees and hide in foliage. To get solid data on the daily activity of breech martens, it is necessary to have information about the activity of these beasts not only in their habitats, but also outside their habitats.

Picture 2. The frequency of encounters with the Breech martens in populated areas in late spring and summer

Picture 3. The frequency of encounters with the Breech martens in populated areas in late spring and summer

Conclusion. From the observations made in all the areas of the National Park and the analysis of the data of the light detectors, we found that in the uninhabited parts of the National Park, the daily activity

of breech martens is mainly regular: they mainly come out of their shelters before the sunset or after and return to their hiding places before the sunrise. The long-term observations made by us clearly show the

negative connection between the duration of daylight hours and the activity of breech martens. However, there are exceptions: during daylight hours, breech martens can often be found outside the hiding places during the mating season in spring and during the brooding season in autumn.

One of the factors influencing the activity of breech martens is the climatic conditions. Our long-term observations have shown that the activity of these beasts is lost if the ambient temperature reaches + 33-35°C and more, and the lower limit is -15-20°C. They are more commonly seen during the day in summer, when the ambient temperature is + 23-25°C, and in winter, when the ambient temperature does not fall below -8 - 13°C.

Another factor influencing the activity of breech martens is the stress caused by humans, which at the same time is a reason for the decrease in the number of these beasts. These beasts are not active during the daytime at those parts of the national park, where there is human economic activity. At these parts they are active only during dusk and at nights. As a result of long-term influence, however, these beasts leave their habitats and remain only at favorable places. Their activity, breeding, growth and development are seriously affected by the forest work and the cutting of the hollow trees or trees with thick trunks.

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**«Качагакаберд» ұлттық паркінің
әртүрлі бөліктеріндегі тас сусарлардың
(*Martes foina* Erxleben, 1777) күнделікті
белсенділігі**

Аңдатпа

Жұмыста 2002-2020 жылдардағы Арқахтың Мартакерт, Аскеран, Шаумян және Кашиатаг аудандарының аумақтарындағы «Качагакаберд» ұлттық паркінің тас сусарлардың белсенділігінің ерекшеліктері көрсетілген. Біз жүргізген бақылаулар ішінде бұл аумақта айтарлықтай ауытқулар жоқ екенін көрсетті. Алайда ауытқулар күннің әртүрлі уақыттарында және жылдың әртүрлі уақыттарында тіркеледі. Зерттеулер көрсеткендей, тас сусарлар көбінесе ымырт пен түнде белсенді болады; дегенмен, олар таңертең және күндіз белсенді бола алады. Көктемде күндізгі уақытта белсенділік байқалады, бұл жануарлардың көктемгі жұптасуымен және қыста, біздің ойымызша, түнгі аязға байланысты төмен белсенділіктің орнын толтырумен байланысты. Бұл жануарлардың тіршілік әрекетінің табиғатындағы өзгерістер ірі Жыртқыштарға, климаттық және антропогендік факторларға байланысты. Бақылау нәтижесінде жазда кезінде температура +33 - +35°C және қыста -15 - -22°C температурада олардың белсенділігі жоғалады. Жазда олар температурада жиі кездеседі +23 - +25°C, ал қыста -8 - -130°C төмен емес температурада. Сусардың өмірлік белсенділігіне әсер ететін факторлардың бірі – кейде экономикалық қызметтің стрессері олардың жойылуына әкеледі.

Түйінді сөздер: «Качагакаберд» ұлттық паркі, аумағы, тас сусары, популяциясы, белсенділігі, климат.

**Суточная активность каменных куниц
(*Martes foina* Erxleben, 1777)
в разных частях национального парка
«Качагакаберд»**

Аннотация

В работе представлены особенности активности каменной куницы национального парка «Качагакаберд» на территориях Мартакертского, Аскеранского, Шаумянского и Кашиатагского районов Арцаха в 2002-2020 годах. Проведенные нами наблюдения показали, что заметных отклонений в пределах участка нет. Однако отклонения регистрируются в разное время суток и в разное время года. Исследования показывают, что каменные куницы в основном активны в сумерках и ночью; однако они также могут быть активными по утрам и в течение дня. Повышенная активность наблюдается в светлое время суток весной, что связано с весенним спариванием животных, и зимой, что, по нашему мнению, связано с компенсацией низкой активности из-за ночных заморозков. Изменения в характере жизнедеятельности этих зверей обусловлены крупными хищниками, климатическими и антропогенными факторами. В результате наблюдений выяснилось, что летом при температуре +33 - +35°C и зимой при температуре -15 - -22°C их активность теряется. Летом они чаще встречаются при температуре +23 - +25°C, а зимой - при температуре не ниже -8 - -130°C. Одним из факторов, влияющих на жизнедеятельность куницы, является стресс от экономической деятельности, которая иногда приводит к их исчезновению.

Ключевые слова: национальный парк «Качагакаберд», территория, Каменная куница, популяция, активность, климат.

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