

N. Myrzakhanov, M. Myrzakhanova

(Университет «Астана-Туран», Астана, Kokshetau State university after name Sh. Ualikhanov,
Kokshetau, Kazakhstan)

SOME ASPECTS OF ETHOLOGY
BIOCHEMISTRY STEPPE MARMOT

(Представлена академиком НАН РК М.Х.Саятовым)

Annotation

In Kazakhstan marmots sharply only in the beginning of the growing season of vegetation, especially perennial grasses. At the onset of heat in late May and early June of ground activity is markedly divided into two cycles, morning and evening, during the midday hours as they come to the surface only occasionally. In the spring, the activity of marmots few drops even overcast days. With the improvement of the nutritional value of plants marmots starts to go away from the burrow.

Key words: adaptation, homeostasis, seasonal cycles, biorhythms.

Тірек сөздер: адаптация, гомеостаз, мерзімдік айналым, биорықтар.

Ключевые слова: адаптация, гомеостаз, сезонная цикличность, биоритмы.

In revealing the mechanisms of adaptation of the steppe marmot is still poorly understood, questions remain ethology and biochemical processes of steppe marmot to environmental changes.

Marmot *Marmota* genus consists of species widely grafting and the largest rodents belonging to the subfamily of terrestrial squirrel.

In some places it is more abundant in Northern and Central Kazakhstan. Large size, relatively high requirements for environmental conditions, as well as to the quality of feed mosaic distribution of marmots within Orel contributed to the development of a process of evolution rather complex population structure [1].

Marmot inhabits relatively distinct families consisting usually of a pair of adults and 5-12 year-olds profit and animals. The diet of marmots clearly expressed seasonal change of feed. Importance in their life has fat accumulation. Found that the total weight of the fat in adult animals during hibernation is 800-1200 g, average about 20% of body weight. In areas of high vegetation marmot is not usually settles. In the semi-desert him a little because of the rapid burning of vegetation and there is a general lack of forage. In early spring, these animals often eat the snow and drink water as dehydrated during sleep the body great need moisture. Spring in their intestines can detect earth (clay, sand), possibly associated with mineral starvation. [2,3].

With the start of the growing season and increases the duration of the feeding of plants eaten by greatly increased. In Kazakhstan marmots sharply only in the beginning of the growing season of vegetation, especially perennial grasses. At the onset of heat in late May and early June of ground activity is markedly divided into two cycles, morning and evening, during the midday hours as they come to the surface only occasionally. In the spring, the activity of marmots few drops even overcast days. With the improvement of the nutritional value of plants marmots starts to go away from the burrow.

Before hibernation marmots activity very significantly reduced. Breeding takes place in a very short time of about 30-35 days, the mating estrus and go at it in early March. The early and amicable terms breeding marmot-probable consequence of frequently repeated and severe droughts in Kazakhstan and undoubtedly have an adaptive value.

In Central Kazakhstan marmot does not go out of their burrows until April, and the first out of the burrows at the end of the first decade of May. In Central Kazakhstan holds marmot hibernation from 215 to 255 days.

It is believed that in Central Kazakhstan annual average population growth of marmot does not exceed 20%. Marmots are trying to eat the grass immediately after coming out of their burrows but the first time in their stomachs dominated by lactic curd mass, which completely replaced by vegetable foods no earlier than one week.

Lactation lasts not less than 50-55 days. In Kazakhstan, the marmot reaches sexual maturity at the end of the third year of life. In adult marmots change mechanism starts from the back, then it is on the sides, only later molt belly, head, groin, tail and mid-June to molt ends.

Thus, we have established some of the environmental features of marmots central Kazakhstan on their populations, feeding, sleep duration, a period of awakening, fat accumulation and seasonal activity [4].

Our plan was to study some aspects of marmots in Central Kazakhstan and some biochemical indices of external respiration and blood products of LP and plasma steppe marmot (*Marmota bobak*).

The material for the study served as the blood and blood plasma 20 steppe marmot both sexes, in the summer and winter period starting weight, which varied depending on the seasonal changes. There have been two series of experimental studies. Total number of animals in the 1-series 10 females and 10 males in the active state during the summer period, the initial weight of 1100 to 4050 g. Total number of animals in the 2-Series -10 females and 10 males, the initial weight from 1070 to 3200 g. The animals were kept on a standard diet of the Central Zoo Karaganda region, under normal temperature and humidity conditions in the natural succession of light and darkness.

A biochemical study of the animals was carried out no later than 1 hour after a set of the blood plasma.

Determination conjugated diene in the blood plasma and the unified method [5,6].

Determination of malondialdehyde in plasma and blood was performed by the modified method [6].

The experimental data were processed using the method of variation statistics. Determined the arithmetic average of the sample (\bar{X}), mean square deviation sigma, error arithmetic average (m). The significance of differences was assessed by Student criterion. In addition, conducted field research on the elements of an animal in the wild.

Our results are shown in Table 1 and 2.

Table 1 – Seasonal changes in lipid peroxidation in the blood plasma of females and males of the steppe marmot ($M \pm m$)

№	The investigated parameters	Plasma, mkmol/ml			
		The winter period n=10		The summer period n=10	
		Female	male	Female	male
1	DC	18.9±1.25	16.5±1.10	21.9±1.47	18.6±2.07
2	SB	0.06±0.002	0.058±0.0018	0.07±0.0029*	0.083±0.013
3	MD	3.29±0.24	2.15±0.19	7.0±0.31*	3.22±0.025*
Note: *-significant in comparison with the group of the summer period $p \leq 0.05$					

Table 2 – Seasonal changes in lipid peroxidation in the blood plasma of females and males of the steppe marmot ($M \pm m$)

№	The investigated parameters	Blood, mkmol/ml			
		The winter period n=10		The summer period n=10	
		Female	male	Female	male
1	DC	19.0±1.35	17.5±1.25	21.9±1.47	20.6±1.35
2	SB	0.02±0.010	0.018±0.0098	0.042±0.015	0.039±0.012
3	MD	6.90±0.25	5.58±0.19	7.0±0.31	5.9±0.025
LP- lipid peroxidation, DC- diene conjugates, SB- Schiff base, MD- malondialdehyde					

As can be seen from Table 1 and 2, the change of these indicators can be seen as DC, SB, MD seasonal nature. The change in performance with respect to gender differences are not significant and are unidirectional nature.

It should be noted the level of LP products in the blood of the steppe marmot is much higher compared to the plasma. It notes relate to all that we have studied lipid peroxidation.

In addition, we found that the level of DC, SB, MD significantly higher in the blood plasma, blood and especially in animals of both sexes.

This fact indicates the presence of conjugated double bonds and changes the contents of these substances in the different seasons of the year. However, we found significant changes in these indicators, in particular SB, MD, only in the blood plasma. While these changes in the blood are in the nature of trends.

This fact may indicate the effective value of LP blood plasma in the adaptation of these animals in the summer and winter. Changes in plasma levels may be associated with the transition of a number of LP products, from the elements of the blood, blood plasma, in moments of crisis adaptation of animals to seasonal changes[4].

Thus, indicators of LP blood steppe marmot vary from season to season, and these changes are non-sexual, and the nature of the species.

1. Established ethological features *Marmota bobac* in Central Kazakhstan.
2. The content of LP products in the blood marmot higher than in the plasma of these animals.
3. The content of LP products is independent of the sex of the animals. LP indicators vary by season.

ЛИТЕРАТУРА

Кандрор И.С. Опыт изучения регуляции физиологических функций. М.; Л., 1954, Т.3. С 153-161

Калабухов Н.И. Спячка животных. М.: Биомедгиз, 1985

Слоним А.Д. Эволюция регуляции тепла и обмена веществ животном организме. Фрунзе, 1983

Виноградов В.В. Гормоны, адаптация и системные реакции организма. Минск: Наука и техника, 1989

Сурки: Биоценологическое и практическое значение./ ред. Зимина Р.П. Москва, 1982

Колпаков М.Г., Колаева С.Г., Красс П.М. и др. Механизмы сезонных ритмов кортикостероидной регуляции зимоспящих. Новосибирск, 1974

REFERENCES

Kandror I.S. The experience of studying the regulation of physiological functions. Moscow, Leningrad, vol.3. p. 153-161.1954

Kalabukhov N.I. Hibernation animals. Moscow. Biomedgiz. 1985

Kolpakov M.G, Kolaeva S.G, Crassus P.M.Mechanisms of seasonal rhythms of corticosteroid regulation of hibernating. Novosibirsk.1974

Slonim A.D. The evolution of the regulation of heat and metabolic animal organism. Frunze.1983

Ushkalova H.&Kadochnikova A. Hormones, adaptation and systemic reactions. Minsk: Science and Technology.1987

Korobeinikova K. Marmots: biocenose and practical value. Moscow.1985.

Н. Мырзаханов, М.Н. Мырзаханова

(«Астана-Тұран» университеті, Астана. Ш. Уәлиханов атындағы Көкшетау мемлекеттік университеті)

ДАЛА СУЫРЛАРЫНЫҢ КЕЙБІР ФИЗИОЛОГИЯЛЫҚ КӨРСЕТКІШТЕРІНІҢ МАУСЫМДЫҚ ӨЗГЕРІСТЕРІ

Резюме

Қоршаған ортада организмдердің қалыптасуы жалпы иерархиялық құрылымы ескеріле отырып, бейімділік әрекетінің негізгі толықтығын қарастыру ғылыми зерттеу барысы бойынша жүзеге асырылады. Адамдар мен жануарлардың бейімділік зерттелуіндегі жүйелік кестелер көрсеткендей, жалпы организмдердің функционалдық мүмкіндік механизмдері анықталып отыр. Кеміргіш организмнің физиологиялық өзгеру мерзімдері, ішкі ортаның әсер етуі кең көлемде қарастырылып соған бейімделуі қалыптасқан, тек жануарларда ғана емес, адамдарда да сол кезеңнің параметрлерін зерттеуді қамтамасыз етеді.

Кілт сөздер: бейімделу, гомеостаз, мерзімдік айналым, биоырғақтар.

Н.Мырзаханов, М.Н. Мырзаханова

(Университет «Астана-Туран», Астана. Кокшетауский государственный университет им. Ш. Уалиханова)

СЕЗОННЫЕ ИЗМЕНЕНИЯ НЕКОТОРЫХ ФИЗИОЛОГИЧЕСКИХ ПАРАМЕТРОВ СТЕПНЫХ СУРКОВ

Резюме

Научные исследования по изучению поведения естественно рассматривает целостное адаптивное поведение, при котором учитываются общая иерархическая структура приспособляемости организма в среде обитания. Как показывает аналитический обзор адаптивных исследований, у человека и животных был выявлен механизм функциональных возможностей организма в целом. Сезонные физиологические изменения в организме грызунов, отражая их глубокую зависимость

от влияния внешней среды, могут обеспечивать изучение параметров этих влияний в цикле жизни не только животных, но и человека.

Ключевые слова: адаптация, гомеостаз, сезонная цикличность, биоритмы.

Поступила 24.09.2013 г.