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THE EFFECT OF MELATONIN IMPLANT ON BODY MASS AND FUR COAT MATURATION OF SILVER FOX

Abstract . The aim of this study was to evaluate the impact of the term of applying synthetic melatonin to accelerate the maturation process of a winter fur coat of silver fox, as well as comparison of body weight of the tested animals, the size and quality of their skin. Experiment was conducted on the fox farm localized in Poland, on 90 adult vixens divided into 3 groups. Animals from the first (G1) and the second group (G2) received implants with 12 mg of melatonin. G1 on the 27th of June and G2 on the 11th of July. The third, control group (C) of vixens did not receive any substances. After selling Finnish Fur Sales auction reports were frequently consulted while examining the quality of animal fur. The received results, which were compared with the results of the third group of foxes, seem to indicate that the synthetic melatonin has a beneficial influence on the animals' growth and weight. The time needed for raising red foxes was reduced by 14 days and the average animal's weight increased by 0,71 – 0,74 kilos. 30% and 27% of the skins of foxes from the first and the second group were considered to be the largest.

Key words: silver fox, melatonin, fur maturation, body mass, fur quality

For many years attempts to accelerate the period of the fur coat maturation process have been conducted, which would allow to improve the economic result of raising the fur animals. The significant issue here are the nutritional changes for more rational, obtained by suitable management of proteins in the period of young animals' intensive growth. In the nutrition of fur-bearing animals, a particularly important role is played by sulfur amino acids considered limiting, methionine and cystine (Dahlman et al. 2004). Research investigating the nutritional implications of methionine and related amino acids in fur animals has shown that increased dietary methionine levels improve the growth performance and fur quality (Gugolek et al. 2012). In the research carried by Rose et al. (1984) on minks, it was proved that the change in the length of the light day in autumn period for 6 hours of light and 18 hours of darkness has a significant influence on the acceleration of fur coat winter maturity. The research on the change of the light day length explicitly showed that melatonin is responsible for the regulation of processes occurring at animals in the daily and annual rhythm. From the mid eighties the research on the usage of synthetic melatonin in the raising of fur animals to accelerate the autumn shedding process as well as the accelerating the growth of the winter fur coat has been started (Kravcov i Kuzniecov, 1990). Due to the benefits connected with usage of the melatonin since 1987 it has been commercially used on the fox farms in Russia (Kravcov i

Kuzniecova, 1990), Finland (Valtonen, 1988) and in Canada (Connor, 1988). Simultaneously, the further scientific research were conducted, aiming mainly to find out the optimal time of implantation, the acceleration of the pace of the body mass growth, suitable nutrition as well as the time of slaughter (Literature). The initial results were not sensational but they gave auspicious prognosis for achieving the desired benefits. Between 1994 and 1995, in Poland some research were being conducted. In that research the time of appearance of winter fur coat maturation at polar foxes was shortened by 15 days (Jarosz i Szeleszczuk, 1995). Similar research was conducted between 1998 and 1999 on silver foxes. In that research the time of raising the experimental animals was shortened by 33-35 days. The quality of the fur coat did not differ from the level of the control group, which could be viewed as the satisfying result of the research (Barabasz et al. 2000).

The aim of this research was the evaluation of the influence of the administering synthetic melatonin time on the acceleration of processes connected with the winter coat maturation at silver foxes as well as the comparison of body mass, size and quality of leather of the tested animals.

Material and methods

The research was conducted on the fox farm situated in Poland. For the experiment 90 vixens from the basic pack in a good conditions, aged 1-8 years were used. They were meant for the autumn slaughter. The animals were divided into 3 groups, in each of them there were 30 animals. After the division the animal body mass was checked. All the animals from the experimental groups (G1 i G2) got subcutaneous implants near the shoulder blade. The implants included 6 mg of melatonin each (Melakryl Inpolimed AO). The animals from G1 received the melatonin on June 27th, and two weeks later on July 11th animals from G2 received the melatonin. The remaining 30 vixen were the control group (C).

For the whole period of the experiment the foxes from all three groups were fed with the same kind of food, which consisted of poultry scraps, fish scraps, bone and meat meal and mineral and vitamin supplements.

At the time of the experiment the observations of the animal coat maturity were carried out. After the full maturation of the winter coat, the foxes were weighed and slaughtered. The skins were taken off with the sack system, they were cleaned, shaped on the stretches and were dried. The ready skins were marked, sorted out and sent to the auction house Finnish Fur Sales (Saga Furs), where they were qualified to the suitable size and quality class, and later they were meant for auction sale. The reports which were received after the auction enabled the comparison of the skin of the foxes which had had the melatonin implanted with the control group as far as their size and quality was concerned. For the statistical needs, the following numerical values were used for each quality class (SR - 6, S - 5, SI - 4, 3. - 3, BR - 2, BRI - 1). The obtained numerical values were statistically worked out with the use of Statistica9.1 package (StatSoft 2010). The average values, the standard deviation and variation analysis were calculated. The difference between the group was assessed by the use of Tukey test.

Results of researches. During the experiment the maturity of the fox fur coat was being controlled. The vixens with the implanted melatonin (G1 and G2) gained the fur coat maturity in the third decade of November and they were slaughtered on

November 24th. The animals from the control group gained the fur coat maturity two weeks later and they were slaughtered on December 7th.

The analysis of variation indicated no statistically significant differences between control and experimental animals in initial body mass (BM1), skin length and skin quality ($P>0,05$) (Tab.1). Analysis of variance indicated statistically significant differences in the final body weight of test animals ($P<0,001$).

Table 1.

The initial and final body mass, skin length and fur quality of foxes treated of melatonin implant.

Group	N	BM1 (kg)		BM2 (kg)		Lenght (cm)		Quality (pts)	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
C	30	5,68	0,78	6,73a	0,74	101,60	5,35	3,53	0,78
G1	30	5,75	0,69	7,47b	0,69	104,47	4,05	3,17	1,09
G2	30	6,12	0,75	7,43b	0,88	103,60	5,24	3,23	1,04
Total	90	5,85	0,76	7,21	0,84	103,22	5,01	3,31	0,98

BM1 – initial body mass; BM2 – final body mass; SD – standard deviation

Different letters in columns indicated statistically significant differences between groups ($P<0,05$).

On the basis of the auction reports it was found that the skin sizes of the foxes with implanted melatonin were bigger than the skin sizes of the control group, but these differences were not statistically significant. 30% of skins from G1 group and 27 % of skins from G2 group were classified to the biggest “30” and “20” sizes. In the control group this percentage was 10%. From the received reports from FFS (Saga Furs) it can be seen that the skins of the foxes from the experimental groups were of a slightly worse quality than the skins of the control group. 70% of skins from the control group were classified to S1 quality class. For the experimental groups this percentage was 60%. Among the skin of foxes from the control group there were no skins of the worst quality (BRI), but about 7% of skins from the test group was in this quality class.

Conclusions

The conducted research has shown that melatonin did not have negative influence on tested animals. The lack of pathological changes in the subcutaneous tissue and the skin in the place of implantation, the good growth of the body mass as well as the behaviors typical for this species prove the well-being was preserved. It appears that the usage of the hormone is connected with the harm and suffering of animals, but certainly it is beneficial for the breeders.

The received results prove the possibility of accelerating the maturity of the winter fur coat of silver foxes by the subcutaneous implantation of synthetic melatonin. However, it is not a satisfying result that the period of breeding was shortened by 14 days. In the research conducted by Barabasz and Bogdanas (2000) it was possible to accelerate the date of slaughter by more than 30 days. The reason of the unsatisfactory result of the experiment could be badly balanced doses of food or different atmospheric conditions than in the quoted experiment.

From the beginning of the research on the usage of synthetic melatonin scientists have asked the question whether the time in which the melatonin is

implanted has an influence on the maturity of winter fur coat. This research has shown that in spite of the two-week difference in the time of implantation, G1 and G2 vixens gained the maturity of winter fur coat at the same time (November 24th). The beneficial result of research was bigger body mass growth and achieving greater final body mass by the vixens with implanted melatonin. Despite a little worse quality of the experimental animals in comparison to the control group, the shortening the time of the fur coat maturity is connected with the huge financial benefits. The achievement of satisfying economical result by the breeders should be the incentive for the scientist to continue the research on the melatonin implementation at fur animals.

On the basis of the conducted research a few conclusions can be made: the usage of the synthetic melatonin has the positive influence on the maturation processes of their winter fur coat; the usage of the synthetic melatonin has the influence on the better usage of feed, and this in turn on the daily growth and the final body mass of these animals; melatonin implants slightly worsen the quality of the fur coat, and above all its density which is thought to be one of the most important features.

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