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INFLUENCE OF GESTATION LENGTH AND MULTIPLICITY OF MATING ENCOUNTERS IN DIFFERENT COLOR VARIETIES OF THE AMERICAN MINK (*MUSTELA VISON*) ON SELECTED PARAMETERS OF REPRODUCTIVE PERFORMANCE

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Abstract. The aim of this study was to analyze the effect of gestational length and multiplicity of mating encounters on selected reproductive parameters within several color varieties of the mink. The material comprised the breeding results of 1285 American mink females of three color varieties: Sapphire, Silverblue, and the Scanbrown. The highest fertility and the highest number of live born and weaned per litter were achieved by Silverblue females. Within all the analyzed gestational length intervals in each color variety, the pregnancies with a length of 45 to 55 days were dominant (78.1% for Sapphire, 75.78% for Silverblue and 64.75% for Brown), while the lowest percentage (3.17% for Sapphire, 6.88% for Silverblue and 3.25% for Brown) represented the pregnancies lasting up to 44 days. The study shows that with an increase in the length of gestation litter sizes become smaller, which is consistent with reports of other authors conducting similar research on this group of animals. We observed an increase in the average litter size with an increase in the number of mating encounters within all analyzed mink color varieties.

Keywords: diapause, gestational length, *Mustela vison*, reproduction

INTRODUCTION

American mink is a monoestrous species, with the heat in March, and copulation-induced ovulation, which usually occurs between 36 and 72 hours after mating [Venge 1973, Wehrenberg et al. 1992]. Pregnancy in mink is also peculiar due to the possible diapause. According to Woliński [1983], diapause duration depends on copulation length and amounts to an average of about 19 days; however, large variations are observed in its duration. Diapause is a suspension of the development of the embryo, mitotic divisions of the embryo are inhibited and the process of its implantation in the uterus is delaying [Song et al. 1995,

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Lopes et al. 2003]. Mink gestational length varies over a wide range, from 36 to up to 85 days, with an average of about 51–52 days [Stevenson 1945, Bowness 1968]. Such wide extent is due to the varying length of diapause [Seremak et al. 2009]. According to many authors, the females mated at the beginning of estrus have longer pregnancies, and those mated later – shorter [Stevenson 1945, Bowness 1968]. According to Song et al. [1995], the length of pregnancy proper, without a period of diapause, is 31 days, but the diapause significantly adds to the total length of gestation. Implantation of embryos in the uterus occurs sometimes only within 2–4 weeks following ovulation [Song et al. 1995]. It has been observed that the pregnancies of not less than 45 days and no longer than 55 days provide the most numerous litters [Kuźniewicz and Filistowicz 1999]. Franklin [1958] found that the longer the period of diapause, the greater the mortality of embryos and thus smaller litters are born. According to Zaitsev [1969] pregnancies lasting less than 40 days are to be considered premature.

Parturitions occur between the last week of April and mid-May. The breeding season begins at the same time both young and adult females; however, in one-year-old females the period from the first mating to birth is longer. According to some authors, the average litter size in the yearling female is lower than in older females [Lorek and Gugołek 1997, Socha and Markiewicz, 2001, Socha and Kołodziejczyk 2006]. However Felska-Blaszczyk et al. [2010 a] found that strict selection for reproductive traits can result in the greatest female fertility in the first year. Mink are reproduced for 2 to 3 years. Socha and Markiewicz (2002) report that the average litter size in Polish mink farms is quite low, ranging from 2.2 to 5.9 individuals. Such large variations in the size of litters mean that there is room to improve this feature. According to other authors, however, the average is higher, in the range 6.4 to 7 young per litter [Sulik and Felska 2000, Felska-Blaszczyk et al. 2010 a and Dziadosz et al. 2010]. According to Lisiecki and Sławoń [1980], the breeder should get an average of four weaned offspring from a good female per year. Within 3 years of farming, such a female gives birth to 12 weaned offspring. This figure must be considered as the lower limit of the profitability of the breeding. The males, on the ather hand, are expected to breed effectively 4–6 females reach year. This allows limiting the number of males in the herd, which in consequence leads to a reduction in overall farm production costs [Kuźniewicz and Filistowicz 1999].

The mating season starting date most commonly used in the literature is 9th to 15th March; however, it may depend on many factors, including sun exposure, age, and color variety. Mink mating season very often begins as early as around 2nd March. In practice, females are mated several times in the copulation season. Yearling females usually begin to mate earliest, at the very beginning of March, two-year-old female start mostly on a later date, from 9–10 March, and later [Lagerkvist et al. 1994]. Yearling females are mated at least 2–3 times, and even four times, and the older female usually two times. Females are bred in various combinations, such as: 1 + 2 + 7 + 8 (total of 4 copulations, numbers indicate consecutive days), 1 + 2 + 7 or 8 (total 3 matings), 1 or 2 + 7 or 8 (two matings). Standard mink are mated earliest (5-6 March), followed by Pastel and Topaz (7–8 March), and finally Sapphire (9–10 March).

The aim of this study was to analyze the influence of gestational length and multiplicity of matings on selected reproductive parameters within several color varieties.

MATERIAL AND METHODS

The study was conducted on a large-scale production mink farm located in West Pomerania, Poland. The material included the breeding results of female American mink of three color varieties: Sapphire, Silverblue and the Scanbrown. Mink of all the colors were kept under the same conditions and fed the same diet based on fish and chicken [Gugołek 2011]. With automatic drinkers, the animals had uninterrupted access to water. We used the breeding data of the season of 2009. The total number of mink in the study was 1,285 individuals, including 438 Scanbrown, 440 Silverblue, and 407 Sapphire. Reproductive performance data were distributed by the duration of pregnancy intervals: up to 44 days 45–56 days, and over 56 days, and also by the number of copulation events: single mating, twice mated, three times mated, and four times mated.

The analysis included the following parameters: length of gestation, litter size, the number of live-born per litter, and the number of weaned per litter. The obtained results were statistically processed using a spreadsheet and the Statistica®9.0 PL software package.

RESULTS AND DISCUSSION

The study shows (Fig. 1) that of the three color varieties analyzed, the highest percentage of pregnancies up to 44 days long was attained by Silverblue females. Such females represented 6.88% of the total whelping females of the variety. This result is more than twice higher as compared with the other two varieties, in which this percentages were 3.17% for Sapphire and 3.25% for Scanbrown. Within all the analyzed color varieties, pregnancy lengths of 45 to 56 days were most frequent. In the case of the longest pregnancy, lasting more than 56 days, Scanbrown revealed as much as 32% of these pregnancies, which was nearly twice as high as in the remaining two color varieties.

According to Kuźniewicz and Filistowicz [1999], the best pregnancies last not less than 46 days and no longer than 55 days, while Zaitsev [1969] found that pregnancies lasting less than 40 days should be considered abnormal, and births premature.

Another analyzed parameter was litter size within each color variety in relation to the length of pregnancy (Fig. 2). We noted a number of differences significant at $P \leq 0.01$ and $P \leq 0.05$ between groups depending on the variety of color and length of pregnancy. As a result of the study, we found that in all the color varieties the shortest pregnancies, up to 44 days, were most prolific; longest pregnancies, beyond 56 days, were characterised by the highest fecundity, which was confirmed statistically (at $P \leq 0.01$ and $P \leq 0.05$). Sapphire mink were characterised by the largest average litter born from pregnancies of up to 44 days (8.2 individual), and the smallest litter sizes from the longest pregnancies (4.98 individual). The analysis reveals that the shortest pregnancies yield most numerous litters. Felska-Błaszczyk et al. [2008] also found that litter size decreased with an increase in gestational length.

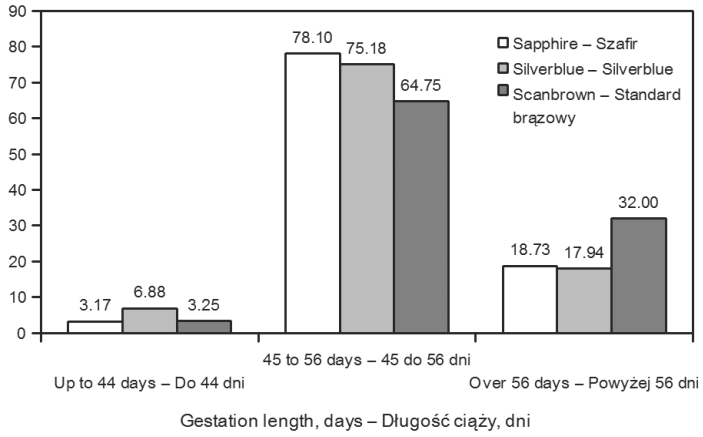

Fig. 1. Percentage distribution of gestation length by color variety in mink
Rys. 1. Rozkład procentowy długości ciąż u analizowanych odmian barwnych norek

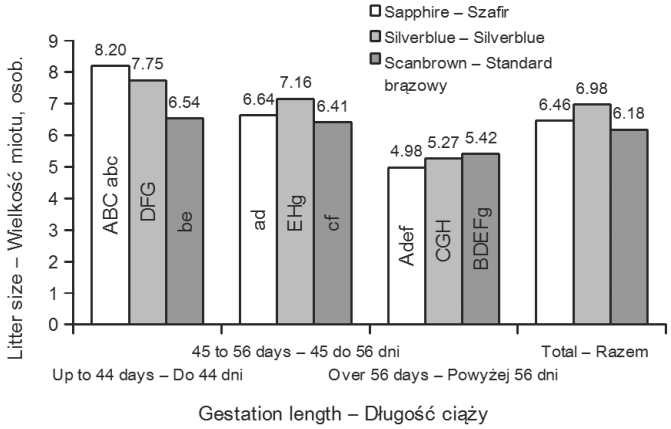

Fig. 2. Litter size in relation to color and the length of pregnancy. Explanation: upper-case letters indicate statistical differences at $P \leq 0.01$, and lower-case letters mark differences at $P \leq 0.05$
Rys. 2. Wielkość miotu w zależności od odmiany barwnej i długości ciąży. Objaśnienia: litery duże alfabetu oznaczają różnice statystyczne na poziomie $P \leq 0{,}01$, a małymi literami oznaczono różnice na poziomie $P \leq 0{,}05$

Among the analyzed color varieties, Silverblue was characterized by the most numerous litters of offspring, whereas Scanbrown had the smallest litters.

The average live-born litter size is shown in Fig. 3. There was a similar relationship here as in the case of litter size and the number of weaned per litter—along with increasing length of pregnancy, the number of live-born per litter decreased. This was confirmed by a number of statistical differences significant at $P \leq 0.01$ and $P \leq 0.05$. The presented

results on the average of live-born Sapphire pups differ significantly from the results presented by Święcicka [2004], who reoprted a much lower number, 6.26 pups. For Brown mink, the author obtained a higher average number of live-born and weaned, 6.77 and 6.24 pups, respectively.

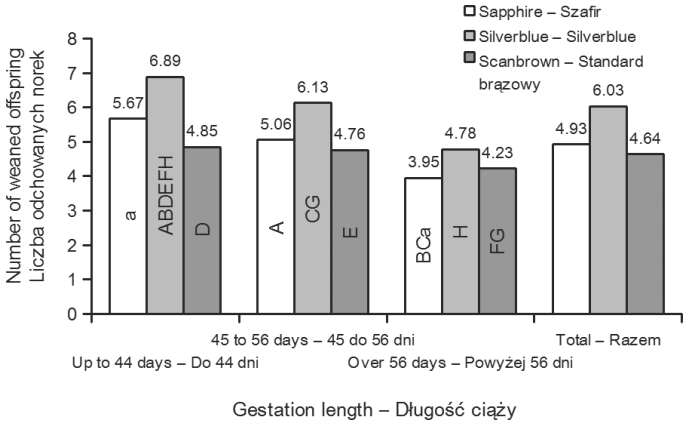

Fig. 3. Live-born litter size depending on the color variety and length of pregnancy. Explanation: upper-case letters indicate statistical differences at $P \leq 0.01$, and lower-case letters mark differences at $P \leq 0.05$

Rys. 3. Liczba urodzonych żywych młodych w miocie w zależności od odmiany barwnej i długości ciąży. Objaśnienia: litery duże alfabetu oznaczają różnice statystyczne na poziomie $P \leq 0,01$, a małymi literami oznaczono różnice na poziomie $P \leq 0,05$

For all color varieties, the highest number of weaned offspring was recorded with the length of pregnancy up to 44 days (Fig. 4). Within this range of gestational length, the highest number of weaned young was attained by the Silverblue variety, which was confirmed by differences significant at $P \leq 0.01$ between this group and the other groups of female mink. For the average number of weaned depending on the color, the greatest value of this parameter was exhibited by Silverblue females (6.03 pups per litter), yielding an average of 1.22 young more than Sapphire (4.93 mink per litter), and 2.04 more than the Scanbrown variety (4.64 mink per litter).

The best reproduction parameters were characteristic for Silverblue females, yielding the highest average litter size, live-born, and weaned mink per litter, 6.98, 6.58, and 6.03 pups, respectively. The poorest results were attained by Scanbrown, 6.18, 5.24, and 4.64 pups for, respectively average litter size, live-born, and weaned mink per litter. For Sapphire females the levels were, respectively, 6.46, 5.68 and 4.93 pups per litter.

The study confirms the findings by Jarosz [1993] and Kuźniewicz and Filistowicz [1999] that pregnancies lasting no longer than 45 days provide the most numerous litters, while pregnancies over 55 days yield reduced litter sizes. Sulik and Felska [2000] concluded, however, that the most numerous litters were obtained from pregnancies lasting 53–54 days. The above-mentioned authors also stated that with increasing length of gestation, litter size is reduced.

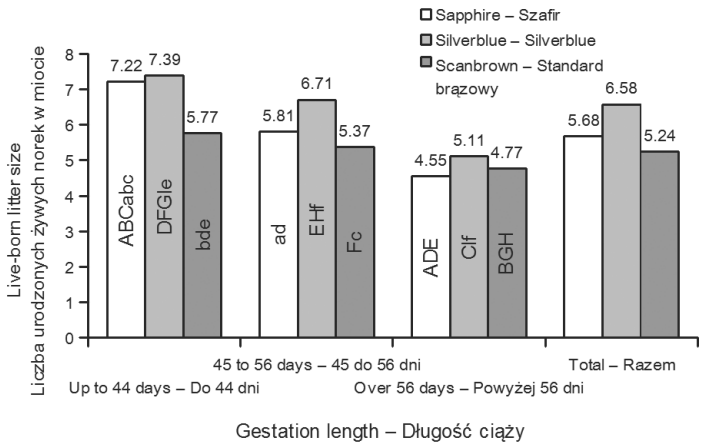

Fig. 4. Number of weaned per litter depending on the color and length of pregnancy. Explanation: upper-case letters indicate statistical differences at $P \leq 0.01$, and lower-case letters mark differences at $P \leq 0.05$.

Rys. 4. Liczba odchowanych norek z miotu w zależności od odmiany barwnej i długości ciąży. Objaśnienia: litery duże alfabetu oznaczają różnice statystyczne na poziomie $P \leq 0{,}01$, a małymi literami oznaczono różnice na poziomie $P \leq 0{,}05$.

Another issue under consideration was the effect of the number of copulation events on the size of the litter, the number of live-born and the number of weaned in the litter. Females within each color variety were mated to a male from one to four times. Table 1 shows the percentage of female mated once, twice, three times, or four times distributed by the color.

Table 1. Percentage of females in relation to the number of effective matings by color variety
Tabela 1. Procent samic w zależności od ilości skutecznych kryć w poszczególnych odmianach barwnych

Color variety Odmiana barwna	Single mating, % Jedno krycie, %	Two matings, % Dwa krycia, %	Three matings, % Trzy krycia, %	Four matings, % Cztery krycia, %
Sapphire Szafir	18.92	46.44	30.46	4.18
Silverblue Silverblue	12.27	23.86	61.14	2.73
Scanbrown Standard brązowy	18.26	22.6	57.53	1.61

Among Scanbrown and Silverblue mink, we found the highest percentage of females that had been mated three times, while Sapphire females were usually mated twice. Those mated four times represented a small minority. The percentage of pregnant Silverblue and Sapphire females increased with the number of copulation encounters. Within the group mated only once, Scanbrown females had the highest proportion of those that gave birth (83.75%), however, the same variety also had the lowest percentage of pregnant females when mating four times.

The analysis of particular reproduction indicators obtained in relation to the number of mating encounters is shown in Table 2. With the increasing number of copulations, the percentage of whelping females increased too. Similar results were reported by Felska-Blaszczyk et al. [2010 b], who found that with the multiple mating events the proportion of sterile females decreases. The shortest pregnancies, on the other hand, occurred as a result of double mating. All the analyzed varieties were characterized by the highest values of the breeding parameters after three or four matings. It should be noted that the number of females mated four times was relatively small, 17 Sapphire, 12 Silverblue, and seven Scanbrown females only.

Table 2. The values of the analyzed reproduction parameters depending on the variety of color and mating multiplicity

Tabela 2. Wartości analizowanych parametrów rozrodu w zależności od odmiany barwnej i krotności kryć

Color variety Odmiana barwna	No. of copulations Liczba kryć	n	Percentage of pregnant females Procent samic wykoconych	Mean gestational length, days Średnia długość ciąży, dni	Litter size Wielkość miotu	Live-born per litter Liczba urodzonych żywych norek w miocie	Weaned per litter Liczba odchowanych norek w miocie
Sapphire Szafir	1	77	66.23	53.06	5.59^{a}	4.84^{a}	4.08
	2	189	72.49	50.66	6.58	5.88	5.12
	3	124	87.1	53.63	6.48	5.68	5.07
	4	17	94.12	54.12	7.75^{a}	6.37^{a}	4.69
Silverblue Silverblue	1	54	64.81	54.63	5.86^{bc}	5.60^{bc}	5.06^{ab}
	2	105	89.52	49.44	6.57	6.20	5.69
	3	269	91.45	53.25	7.20^{b}	6.75^{b}	6.17^{a}
	4	12	100	53.08	8.17^{c}	7.75^{c}	7.50^{b}
Scanbrown Standard brązowy	1	80	83.75	54.60	5.60	4.87	4.39
	2	99	82.83	49.07	6.24	5.56	4.89
	3	252	94.05	54.85	6.23	5.21	4.57
	4	7	85.71	56.00	6.00	5.70	5.33

The numbers marked with the same letters differ significantly at $P \leq 0.05$.
Liczby oznaczone tymi samymi literami różnią się istotnie przy $P \leq 0,05$.

By analyzing the litter sizes, it can be concluded that the most fertile were Sapphire and Silverblue females after four matings, yielding an average litter size 7.75 and 8.17, respectively. Scanbrown attained the highest fertility with two matings (6.24 pups). In Sapphire and Silverblue females, the average litter size born after four copulation events was significantly higher (at $P \leq 0.05$) compared with a single mating. It should be stressed that in all the analyzed color varieties the lowest values of reproductive parameters were obtained when females had been mated only once.

Number of copulations is related directly to the date of the first mating—mink mated once are as a rule mated again later, and those mated four times are for the first time ad-

mitted to the male earlier (in early March). It was found that the date of the first mating has a significant effect on the litter size and length of gestation [Barabasz 2002, Felska-Błaszczyk et al. 2010 b]. Date of the first mating has a big impact on litter size and the number of pups weaned from the litter; that is why the right choice of this date is key to the reproductive success. It has been repeatedly stated that the earliest mating, before March 5, had the most beneficial effect on the reproductive performance [Socha and Markiewicz 2002]. Felska-Blaszczyk et al. [2010 b] reported that the most optimal mating period is from 1 to 10 March, since that period resulted in the lowest percentage of sterile females. According to Socha and Markiewicz [2002], females achieve the poorest results when mated at the latest date, after 15 or 20 March.

CONCLUSIONS

Of all the studied color varieties of mink, highest fertility, the highest number of live born and weaned per litter was found for Silverblue females. Within all the analyzed gestational length intervals for each color variety, the most frequent were pregnancies of 45 to 55 days (78.1%, 75.78%, and 64.75%, for Sapphire, Silverblue, and Brown, respectively), while the least frequent (3.17%, 6.88%, 3.25%, respectively) were the pregnancies lasting up to 44 days. The study shows that with an increase in gestational length, litter size becomes reduced; this is consistent with findings reported by other authors who conducted similar research on this group of animals.

We observed that the average number of pups per litter increases with a growing number of mating repetitions, which pertains to all the analyzed mink color varieties.

REFERENCES

Barabasz B., 2002. Współczesne badania nad dobrostanem norek [Modern studies on mink welfare]. Zesz. Nauk. Prz. Hod. 64, 7–11 [in Polish].

Bowness E.R., 1968. A survey of the gestation period and litter size in ranch mink. Can. Vet. J. 9 (5), 103–106.

Dziadosz M., Seremak B., Lasota B., Masłowska A., Mieleńczuk G., 2010. Analiza wybranych cech reprodukcyjnych samic norek (*Neovison vison*) różnych odmian barwnych na przestrzeni kolejnych lat badawczych [Analysis in some reproduction traits of female mink (*Neovison vison*) depending on the colour varieties and age]. Acta Sci. Pol., Zootechnica 9 (4), 71–80 [in Polish].

Felska-Błaszczyk L., Najmowicz M., Sulik M., Błaszczyk P., 2008. Wybrane parametry rozrodu norek (*Neovison vison*) różnych odmian barwnych w aspekcie długości ciąży [Selected parameters of reproduction in mink (*Neovison vison*) of various color varieties in the context of gestational length.] Zesz. Nauk. Prz. Hod. 4 (4), 147–157 [in Polish].

Felska-Błaszczyk L., Sulik M., Dobosz M., 2010 a. Wpływ wieku i odmiany barwnej na wskaźniki rozrodu norek (*Neovison vison*) [Effect of age and color variety on reproduction parameters in mink (*Neovison vison*)]. Acta Sci. Pol., Zootechnica 9 (3), 19–30 [in Polish].

Felska-Błaszczyk L., Sulik M., Panknin A., 2010 b. Wielkość jałowienia samic norek (*Mustela vison*) różnych odmian barwnych w zależności od różnych systemów i terminów krycia [The incidence of barren females of mink (*Mustela vison*) of various colour types in relation to systems and dates of mating]. Acta Sci. Pol., Zootechnica 9 (4), 81–92 [in Polish].

Franklin B.C., 1958. Studies on the effects of progesterone on the physiology of reproduction in the mink, *Mustela vison*. Ohio J. Sci. 58 (3), 163–170.

Gugołek A., 2011. Zalecenia żywieniowe i wartość pokarmowa pasz. Zwierzęta futerkowe [Feeding recommendations and feed nutritional values. Fur-bearing animals]. Praca zbiorowa. Instytut Fizjologii i Żywienia Zwierząt im. Jana Kielanowskiego PAN, Jabłonna [in Polish].

Jarosz S., 1993. Hodowla zwierząt futerkowych [Fur Animal Farming]. Wydaw. Naukowe PWN, Warszawa [in Polish].

Kuźniewicz J., Filistowicz A., 1999. Chów i hodowla zwierząt futerkowych [Farming and breeding fur animals]. Wydaw. Akademii Rolniczej we Wrocławiu. Wrocław [in Polish].

Lagerkvist G., Johansson K., Lundeheim N., 1994. Selection for litter size, body weight, and pelt quality in mink (*Mustela vison*): correlated responses. J. Anim. Sci. 72, 1126–1137.

Lisiecki H., Sławoń J., 1980. Hodowla norek [Mink Breeding]. PWRiL, Warszawa [in Polish].

Lopes F.L., Desmarais J., Gévry N.Y., Ledoux S., Murphy B.D., 2003. Expression of vascular endothelial growth factor isoforms and receptors Flt-1 and KDR during the pre-implantation period in the mink, *Mustela vison.* Biol. Reprod. 68, 1926–1933.

Lorek M.O., Gugołek A., 1997. Wpływ krzyżowania międzyodmianowego norek na wskaźniki użytkowe [Effect of inter-variety crossing of mink on performance indices]. Acta Acad. Agric. Tech. Olst., Zootech. 46, 181–187 [in Polish].

Seremak B., Lasota B., Masłowska A., Dziadosz M., Mieleńczuk G., 2009. Analiza zależności między datą pierwszego krycia a datą implantacji i długością ciąży u norki amerykańskiej (*Neovison vison*) odmiany wild i standard [Analysis of relation between the date of first mating to the date of implantation and gestation length in wild and standard color american mink (*Neovison vison*)]. Acta Sci. Pol., Zootechnica 8 (4), 41–48 [in Polish].

Socha S., Kołodziejczyk D., 2006. Analiza czynników wpływających na plenność samic norek standardowych i palomino [Analysis of factors affecting fertility of standard and palomino female mink]. Annales UMSC, Lublin 24 (56), 403–408 [in Polish].

Socha S., Markiewicz D., 2001. Analiza czynników wpływających na plenność norek [Analysis of factors affecting fertility of mink]. Med. Weter. 11, 840–843 [in Polish].

Socha S., Markiewicz D., 2002. Effect of mating and whelping dates on the number of pups in mink. Electronic Journal of Polish Agricultural Univeristies, Animal Husbandry 5 (2), http://www.ejpau.media.pl/volume5/issue2/animal/abs-02.html (16.06.2012).

Song J.H., Carriere P.D., Leveille R., douglas D.A., Murphy B.D., 1995. Ultrasonographic analysis of gestration in mink (*Mustela vision*). Therigenology 43, 585–594.

Stevenson W.G., 1945. The gestation period of mink. Can. J. Compar. Med. 9 (2), 38–39.

Sulik M., Felska L., 2000. Ocena wpływu samca i terminu krycia na plenność i długość ciąży u norek [Assessment of the impact of male and timing of mating on fertility and pregnancy length in mink]. Prz. Hod. 53, 115–121 [in Polish].

Święcicka N., 2004. Analiza cech reprodukcyjnych u norek odmian: Scanblack, Scanbrown, Mahogany, Sapphire [Analysis of reproductive traits in mink of the varieties: Scanblack, Scanbrown, Mahogany, Sapphire]. Zesz. Nauk. Prz. Hod. 34, 133–141 [in Polish].

Venge O., 1973. Reproduction in the mink. Yearbook 1973. The Royal Veterinary and Agricultural University Copenhagen, 95–146.

Wehrenberg W.B., Kurt K.J., Hutz R.J., 1992. Effects of equine chorionic gonadotropin on reproductive performance in anestrous mink. J. Anim. Sci. 70, 499–502.

Woliński Z., 1983. Na czym polega zjawisko opóźnionej implantacji u norek [What is the phenomenon of delayed implantation in mink.] Hod. Drob. Inwentarza 4, 8–10 [in Polish].

Zaitsev A.G., 1969. Niekotoryje faktory obusłowliwajuszczje płodowi tost amerkianskoj norki [Some factors affecting fetility in American mink]. Charkowskij Zooweterynarnyj Instytut, Kirow [in Russian].

WPŁYW DŁUGOŚCI CIĄŻY I KROTNOŚCI KRYĆ RÓŻNYCH ODMIAN BARWNYCH NORKI AMERYKAŃSKIEJ (*MUSTELA VISON*) NA WYBRANE WSKAŹNIKI UŻYTKOWANIA ROZRODCZEGO

Streszczenie. Celem pracy była analiza wpływu długości ciąży i krotności kryć na wybrane parametry rozrodu w obrębie kilku odmian barwnych. Materiałem do badań były wyniki rozrodu 1285 samic norki amerykańskiej trzech odmian barwnych: szafir, silverblue oraz standard brązowy. Największą plennością, liczbą urodzonych żywych i odchowanych norek w miocie charakteryzowały się samice odmiany silverblue. W obrębie wszystkich analizowanych przedziałów długości ciąż dla poszczególnych odmian barwnych, ciąże o długości od 45 do 55 dni stanowiły najwyższy procent (78,1% dla odmiany szafir, 75,78% dla odmiany silverblue oraz 64,75% dla odmiany brąz), natomiast najniższy procent (3,17% dla odmiany szafir, 6,88% dla odmiany silverblue oraz 3,25% dla odmiany brąz) stanowiły ciąże trwające do 44 dni. Z przeprowadzonych badan wynika, że wraz ze wzrostem długości ciąży, zmniejsza się wielkość miotu, co jest zgodne z doniesieniami innych autorów prowadzących podobne badania dotyczące tej grupy zwierząt. Wraz ze wzrostem liczby kryć, zauważono wzrost średniej liczby urodzonych szczeniąt w miocie w obrębie wszystkich analizowanych odmian barwnych norek.

Słowa kluczowe: diapauza, długość ciąży, *Mustela vison*, rozród

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