

MINK FERTILITY OF PALOMINO COLOUR TYPE AND ITS CROSSBREEDS WITH DIFFERENT PERCENTAGES OF STANDARD MINK GENES

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Abstract. The work presents an analysis of palomino female mink fertility. There were three genetic groups within the palomino colour type: purebred mink (no standard genes), crossbreeds I (palomino with 50% standard genes) and crossbreeds II (palomino with 25% standard genes). The experimental material was obtained at two breeding farms located in northern Poland. An assessment was made of the following reproductive characteristics: number of mink at birth, number of mink reared and gestation length. Values of the aforementioned characteristics were subjected to analysis of variance and significance of differences between selected factors was checked. Female age was the factor which had a highly significant influence on the fertility of mink genetic groups. The highest number of kits per litter was recorded for two-year-old palomino females (5.91 on average) and palomino females with 50% standard genes (6.91, on average). The shortest gestation period was typical of females mated three times for all the mink genetic groups. The average gestation length in this mating system ranged between 46.08 and 48.22 days. Crossbreeding between colour types also had an influence on mink fertility. Female mink from crossbreed group I had the highest average number of kits born and reared (6.38 and 5.76, respectively).

Key words: colour type, crossing between colour types, fertility, genetic group, mink

INTRODUCTION

Breeding profitability is influenced by reproduction performance and every breeder should aim at creating conditions that allow them to obtain the best breeding material. The value of breeding animals is conditioned not only by their

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appearance but also reproductive characteristics such as: fecundity and fertility. Fecundity is the ability of males and females to reproduce [Maciejowski and Jeżewska 1993] and fertility is the number of offspring born throughout the year and reared till weaning [Jarosz 1993].

Standard mink is the basic colour type in breeding [Bielański et al. 2005]. However, other colour types are obtained by crossbreeding individual original types between each other (crossing between colour types) and with standard individuals. The present-day beautiful colours, such as pearl mink or palomino, are a result of such crossbreeding. According to Jeżewska and Maciejowski [1986] as well as Gliński and Kostro [2002], there are several dozen gene pairs that result in colour types. The genes are inherited independently, and can be combined in different ways, but the effect of these genes on characteristics associated with reproduction is not always beneficial. As a result, it is necessary to analyse them.

The objective of the study was to analyse the fertility of palomino female mink as well as crossbred females with different percentages of standard genes.

MATERIAL AND METHODS

Data from two breeding farms located in northern Poland were examined. The farms specialise in fox and mink breeding. The study included a palomino mink group; the following female mink were analysed: palomino, palomino with 50% standard genes (crossbreeds I) and palomino with 25% standard genes (crossbreeds II). The analysis included a total of 1509 females from the foundation stock including: 1428 palomino mink, 62 crossbreed I mink and 19 crossbreed II mink. The following reproductive characteristics were considered: number of kits born, number of kits reared and gestation length. Multifactor analysis of variance was performed and significance of selected factors was checked. The following fixed interactions were included in the model:

- genetic group x female age with gestation length regression for the number of kits born and reared,
- genetic group x number of matings for gestation length. The gestation length analysed in the work was defined as the number of days from the last mating to whelping.

The values of characteristics analysed were presented as least square means (lsm). Calculations were performed using the statistical package SAS [1996].

RESULTS

Female age was the factor which had a highly significant effect on the fertility of the mink genetic groups examined in the study. Figure 1 presents the average number of kits born according to the genetic group and female mink age.

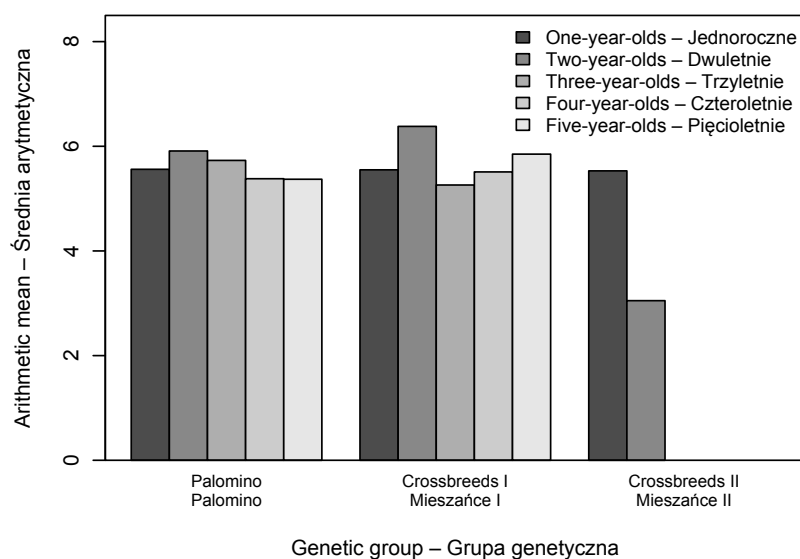


Fig. 1. Average numbers of kits born according to genetic group and female age

Rys. 1. Średnia liczba urodzonych szceniąt w zależności od grupy genetycznej i wieku samicy

Mean values – presented in Figure 1 indicate that most newborn kits per litter were recorded for the crossbreed I group (palomino with 50% standard genes) in the second year of their utilisation (6.38 on average). Also, two-year-old palomino female mink without standard genes had more kits per litter compared with the remaining females. The average number of newborn kits for these females was 5.91. The results for crossbreed I mink (palomino with 25% standard genes) in the second year of utilisation were clearly different from the results for the females of the remaining genetic groups. Two-year-old crossbreed II females gave birth to a very low average number of kits, that is 3.05 (Fig. 1). The one-year-old females of all the experimental groups gave birth to a similar number of kits. The average number was 5.56 for palomino females, 5.55 for crossbreed I females and 5.53

for crossbreed II females. When mink older than two years of age were taken into account, it was observed that the number of kits per litter clearly decreased for the so-called purebred females which were three, four and five years of age. What is interesting is the fact that the opposite situation was observed for crossbreeds I. Fertility of three-year-old and older mink in this group increased gradually, and in the last (fifth) year of utilisation it reached the mean similar to the average value obtained for the two-year-old females (5.85 on average).

Results for the average number of kits weaned were the same as the results obtained for the number of kits at birth per litter. The highest means were calculated for two-year-old females belonging to all the genetic groups, excluding palomino mink with 25% standard genes (crossbreeds II) whose primiparous females had best reproduction indicators (Fig. 2). Palomino female mink three, four, and five years of age reared less and less kits each year whereas palomino females with 50% standard genes revealed the opposite trend – more and more kits were reared each year (Fig. 2).

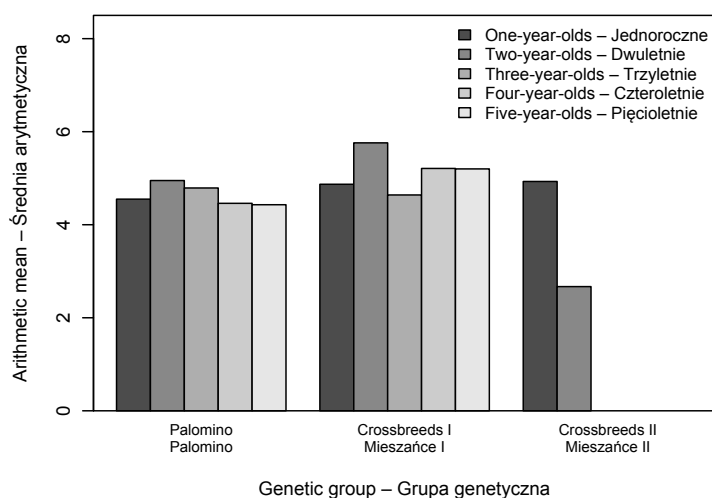


Fig. 2. Average numbers of kits weaned according to genetic group and female age

Rys. 2. Średnia liczba odchowanych szczeniąt w zależności od grupy genetycznej i wieku samicy

Gestation length – in addition to the number of kits born and reared – was one more reproductive characteristic which was analysed in the present work. The current study showed that number of matings had a significant influence on the

length of gestation period. Systems based on three matings of mink belonging to the genetic groups examined were used on the farms. Palomino mink and palomino mink with 50% standard genes (crossbreeds I) mated once, twice and three times whereas palomino females with 25% standard genes (crossbreeds II) mated twice or three times. The results obtained by the females from individual genetic groups according to different mating systems are resented in Figure 3.

The longest gestation was characteristic of females from all the genetic groups which had mated once, excluding crossbreeds II which, as mentioned above, mated twice or three times. The longest average gestation period – 54.06 days – was found for the so-called purebred female mink.

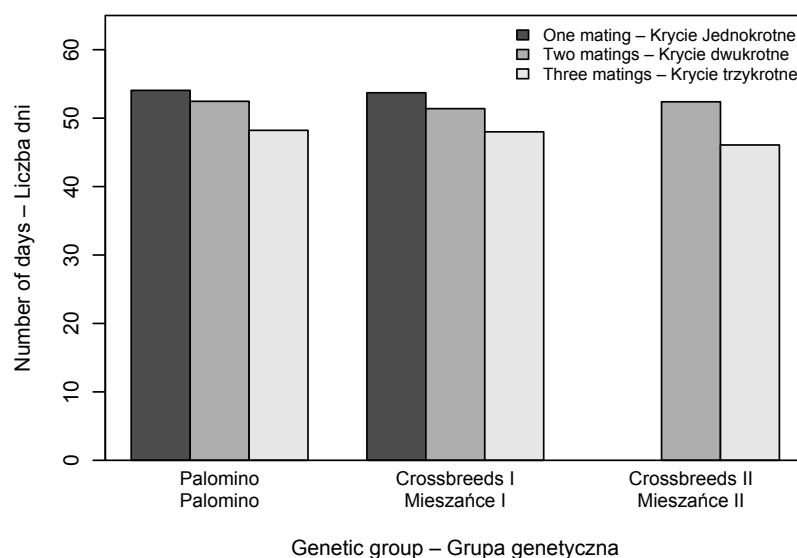


Fig. 3. Gestation length according to genetic group and number of matings

Rys. 3. Długość ciąży w zależności od grupy genetycznej i liczby kryć

When the system two matings had been used, pregnancies were shorter and lasted on average 52.46 days for palomino female mink without standard genes, 51.39 days for crossbreeds I and 52.39 days for crossbreeds II. Gestations were considerably shorter when the system of three matings had been applied irrespective of the mink genetic group. Means for this mating system ranged from 46.08 to 48.22 days (Fig. 3).

DISCUSSION

The present study revealed that, when female age is concerned, purebred females and crossbreeds I had the highest average number of kits per litter in the second year of their reproductive utilisation (Fig. 1). Also for two-year-old females from these two genetic groups, the highest average numbers of kits reared were recorded (Fig. 2). These results agree with the literature as many authors [Bernacka and Kubacki 1982, Holmqvist 1991, Socha and Markiewicz 2001, Rozempolska-Rucińska 2004, Rozempolska-Rucińska et al., 2004] have reported that two-year-old female mink produce the highest number of kits per litter. What is more, the best reproduction results for two-year-old females have been reported for other fur animals, too [Jeżewska et al. 1994, Brzozowski et al. 1999, Szeleszczuk 2001].

When female mink older than two years of age are taken into account, their reproduction results agree with findings reported in other works [Holmqvist 1991, Maciejowski and Jeżewska 1993] but only in the case of palomino female mink with no standard genes. The reproductive performance of these females was worse each year whereas three-, four- and five-year-old female mink from the crossbreed I group had more and more numerous litters each year, reaching the best reproductive performance in the last year when it was similar to the performance of two-year-olds. It may indicate that a percentage share (50% in this case) of genes of other colour types has a beneficial effect on mink fertility. That crossbreeding between colour types is beneficial is also supported by the fact that female mink of crossbreed I group had the highest fertility of all the animals examined. The average number of kits born and reared was, respectively 6.38 (Fig. 1) and 5.76 (Fig. 2).

An analysis of gestation length demonstrated that the results obtained in the study discussed differ from the findings reported by Felska-Błaszczuk et al. [2008]. These authors found that the longest pregnancy periods were associated with the system of two matings for sapphire and standard black female mink, and the system of three matings for standard brown females. The results of this study indicated that the longest gestation periods were recorded for the females which mated once in all the genetic groups, excluding crossbreeds II for which the system of two and three matings had been applied. A considerable shortened gestation period was observed when the system of three matings had been applied in all the genetic groups examined in the study.

It should be pointed out, however, that the present study and the works mentioned above focused on different colour types so it can be inferred that there is an influence of colour type on mink gestation length.

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PLENNOŚĆ NOREK ODMIANY PALOMINO ORAZ PALOMINO Z RÓŻNYM UDZIAŁEM PROCENTOWYM GENÓW ODMIANY STANDARDOWEJ

Streszczenie. W pracy dokonano analizy plenności samic norek odmiany palomino. W obrębie odmiany palomino były trzy grupy genetyczne: norki czyste (bez żadnego udziału procentowego genów odmiany standard); mieszańce I (norki palomino z 50-procentowym udziałem genów odmiany standard) i mieszańce II (norki palomino z 25-procentowym udziałem genów odmiany standard). Materiał do badań pochodził z dwóch ferm hodowlanych, położonych na terenach północnej Polski. Ocenie poddano takie cechy rozplodowe, jak liczbę urodzonych i odchowanych norcząt oraz długość ciąży. Dla wymienionych cech przeprowadzono wieloczynnikową analizę wariancji, weryfikując istotność wybranych czynników. Czynnikiem wysoko istotnie warunkującym plenność badanych grup genetycznych norek okazał się wiek samic. Najwięcej młodych w miocie uzyskano od samic dwuletnich z grupy palomino (średnio 5,91) oraz palomino z 50-procentowym udziałem genów odmiany standardowej (średnio 6,38). Najkrótszymi ciążami charakteryzowały się trzykrotnie kryte samice wszystkich badanych grup genetycznych norek. Średnia długość ciąży przy tym systemie kryć kształtowała się na poziomie 46,08–48,22 dnia. Nie bez znaczenia dla plenności norek okazało się krzyżowanie międzyodmianowe. Samice norek z grupy mieszańców I charakteryzowały się najwyższą średnią liczbą urodzonych (6,38) i odchowanych (5,76) norcząt.

Słowa kluczowe: grupa genetyczna, krzyżowanie międzyodmianowe, norka, odmiana barwna, plenność

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