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EFFECT OF AGE OF PARENTS AND BREEDING SEASON ON LITTER SIZE IN ROMANIAN SHEPHERD DOG - CARPATIN

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Abstract

In order to obtain the comprehensive knowledge of a breed and to achieve an easier and well-planned breeding procedure, it is necessary to understand the reproductive traits of a breed. 90 whelpings of Romanian shepherd dog Carpatin were analyzed in period from 2000 to 2006. Data were obtained from official documentation - litter reports of Kennel club of Romania. Basic parameters of descriptive statistics for the number of whelped pups, such as mean size, standard deviation, variation coefficient, minimum and maximum were determined.

Effect of the sire's age on the number of produced whelps was studied by sorting the sires into 9 groups according to their age at mating (from 1 to 9 years of age), as was the effect of dam's age at the time of mating. Dams were sorted in 7 groups (from 1 to 7 years of age). A single-factor analysis model (the F-test) was used to determine the impact of the mating season on the number of produced whelps, and all whelpings were grouped according to the time of the mating into four groups: 1 – winter, 2 – spring, 3 – summer, 4 – fall.

Mean litter size was 5,40 whelps. Mean number of male whelps in litters was 2,80 and mean number of female whelps was 2,80. Variance analysis concluded that influence on breeding season has no statistical importance on the length of gravidity, and that there is no statistical importance between breeding season and litter size and ratio of sexes in the litter, and that there is no statistical importance between age of the parents and total number of whelps in the litter or ratio of sexes in the litter.

By studying fertility parameters of Romanian shepherd dog Carpatin in relation to age of parents and mating season, it was determined that there is no statistical importance of impact of these factors on the observed fertility parameters of this breed.

Keywords: reproductive traits, Carpatin, parents, whelps

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Introduction

FCI accepted the Romanian shepherd dog Carpatin as a breed in 2005. The official standard was published on 6.7.2005. under serial number 350 (2). The breed was assigned to FCI group 1, and its current status, which will last until 2015 is, provisionally accepted breed.

First standard for this breed was published in 1934 by National Zootechics Institute in Bucarest. Next change and addition to the standard was made in 1982, then in 1999 and in 2001. The next Carpatin standard, written in accordance with the FCI demands, was published by the Kennel club of Romania on 30.3.2002 and then presented to the FCI.

As is the case with many other breeds, the Carpatin standard does not describe biological traits of the breed, but only describes exterior parameters according to which the dogs that participate on shows are graded. In order to obtain the comprehensive knowledge of a breed and to achieve an easier and well-planned breeding procedure, it is necessary to understand the reproductive traits of a breed. Fertility is one of major reproductive traits and influence of certain parameters to it bears great significance. The aim of this paper is to explore the influence of the age of the parents and mating season on litter size and ratio of sexes in the Carpatin litters.

As Carpatin is a new breed, no studies of this problem are available in the cynological literature. There is, however, certain written data on Šarplaninac, Tornjak and Serbian shepherd dog, breeds of shepherd dogs somewhat similar to Carpatin.

The purpose of this study was to determine the reproductive performance and the number of pups per litter for this breed, as well as whether breeding season has an effect on litter size. Having in mind previous research done on similar breeds of shepherd dogs is expected that obtained results do not differ a greater degree than the results of similar breeds.

Material and methods

90 whelpings of Romanian shepherd dog Carpatin were analyzed in period from 2000 to 2006. Data were obtained from official documentation - litter reports of Kennel club of Romania. Basic parameters of descriptive statistics for the number of whelped pups, such as mean size, standard deviation, variation coefficient, minimum and maximum were determined.

Effect of the sire's age on the number of produced whelps was studied by sorting the sires into 9 groups according to their age at mating (from 1 to 9 years of age), as was the effect of dam's age at the time of mating. Dams were sorted in 7 groups (from 1 to 7 years of age). A single-factor analysis model (the F-test) was used to determine the impact of the mating season on the number of produced whelps, and all whelpings were grouped

according to the time of the mating into four groups: 1 – winter, 2 – spring, 3 – summer, 4 – fall.

Results and discussion

Parameters of descriptive statistics for the number of produced whelps are shown in Table 1.

Table 1. Number of obtained puppies (n=90)

	Mean	S.D.	C.V. (%)	Min	Max
Length of pregnancy (days)	61,80	1,530	2,48	54,00	66,00
Total number of puppies per litter	5,40	2,525	46,76	1,00	13,00
Mele puppies per litter	2,80	1,915	68,39	0,00	10,00
Female puppies per litter	2,60	1,556	59,85	0,00	6,00

Mean litter size was 5,40 whelps with variation coefficient of 46,76%. Mean number of male whelps per litter was 2,80 with variation coefficient 68,39%, and mean number of female whelps in the litter was 2,60 with variation coefficient of 59,85%. Mean gravidity length was 61,80 days with variation coefficient of 2,48%. Variance analysis determined that the effect of mating season on length of gravidity has no statistical importance. Also, variance analysis determined that there is no statistical importance of the effect of the mating season on the litter size and ratio of sexes in the litter.

By studying some reproductive traits of Yugoslav shepherd dog Šarplaninac, Urošević et al. (*1987*.) noted that mean size of the litter is 6,13, which is more than the average number of puppies in litters obtained by karpatin. If the litter is observed by genders, then there are 3,53 male and 3,05 female whelps in the litter on average, whereas in this case, that number was less. Mean gravidity length was 61,98 days, with notably low variability, as for the karpatin.

Mitrović also wrote on Šarplaninac fertility (*1972*.). Autor studied this trait in the period 1969-1971 and determined that mean number of whelps ranged from 5,6 to 6,2, which is consistent with the data obtained in this study.

Problem of seasonal variations of Šarplaninac's reproductive traits was studied by Urošević and Latinović (*1988*.), who concluded that litters with 6 whelps were most common (18,07%), while litters with 5 whelps came as second with 17,67%. Number of male whelps ranged from 2 to 5, while it was most common to have 3 female whelps in a litter. This research determined that mating season had no effect on the size of the litter.

Table no. 2 shows results of study of the effect of the sire's age on the litter size.

Table.2. Influence of father's age and breeding season on the number of obtained puppies

Father's age (years)	The average number of puppies	S.D.	The average number of male puppies	S.D.	The average number of female puppies	S.D.	N
1	6,22	0,85	3,67	0,65	2,56	0,52	9
2	5,93	0,66	2,73	0,50	3,20	0,40	15
3	4,31	0,70	2,23	0,54	2,08	0,43	13
4	5,33	0,85	3,11	0,65	2,22	0,52	9
5	4,60	0,66	2,47	0,50	2,13	0,40	15
6	5,90	0,80	3,10	0,62	2,80	0,49	10
7	6,40	1,13	3,60	0,87	2,80	0,70	5
8	5,80	0,80	2,50	0,62	3,30	0,49	10
9	4,75	1,27	2,50	0,97	2,25	0,78	4

Variance analysis determined that there is no statistically important effect of the sire's age on the litter size, or on the ratio of sexes in the litter.

Effect of the dam's age on size of the litter is shown in the next table.

Table 3. The impact of mother age and breeding season on the number of obtained puppies

Mother's age (years)	The average length of pregnancy	S.D.	Average total number of puppies	S.D	The average number of male puppies	S.D.	The average number of female puppies	S.D.	N
1	61,62	0,436	5,462	0,709	2,923	0,539	2,538	0,443	13
2	61,76	0,343	5,048	0,558	2,714	0,424	2,333	0,348	21
3	61,81	0,343	6,048	0,558	3,143	0,424	2,905	0,348	21
4	61,92	0,436	5,923	0,709	3,154	0,539	2,769	0,443	13
5	61,56	0,524	5,111	0,852	2,667	0,647	2,444	0,532	9
6	62,40	0,703	4,400	1,143	1,800	0,869	2,600	0,714	5
7	61,88	0,556	4,625	0,903	2,125	0,687	2,500	0,564	8

Variance analysis determined that there is no statistically important effect of the dam's age at the time of mating on the size of the litter, or on the ratio of sexes in the litter..

Basic fertility traits of Serbian shepherd dog were studied by Urošević et.al. (*2010.*) can be compared with the results from this study. It was determined that mean litter size is 5,93 whelps with variation coefficient of 46,88%. The average number of pups per karpatin litter was 5.40, which is almost same number of pups. Mean number of male whelps in the litter was 2,78, and of female whelps 3,15. Research indicated that age of the parents and breeding season have no statistically important effect on the size of Serbian shepherd dog litters, as is the case with the data obtained for karpatin.

Parameters of fertility traits, observed by mating seasons, are shown in table 4.

Tab. 4. Parameters of fertility traits observed by breeding season

Season	The average length of pregnancy	S.D.	Average total number of puppies	S.D	The average number of male puppies	S.D.	The average number of female puppies	S.D.	N
Winter	60,86	0,401	5,286	0,680	2,143	0,513	3,143	0,411	14
Spring	62,00	0,234	5,732	0,397	3,073	0,300	2,659	0,240	41
Summer	62,00	0,354	5,278	0,600	2,611	0,452	2,667	0,363	18
Autumn	61,88	0,364	4,824	0,617	2,882	0,465	1,941	0,373	17

Karpatin and Tornjak are two similar breeds of shepherd dog. Bosnia-Herzegovina-Croatian shepherd dog Tornjak was the subject of a study undertaken by Urošević et.al. (*2001*.). It was determined that mean litter size is 4,81, with range from 1 to 10. Mean number of male whelps was 2,76 while mean number of female whelps was 2,05. Similar values of the average number of puppies, as well as the number of male and female pups were obtained in this study. Authors determined that there is no statistically important difference neither by the sexes nor by the mating season, despite the high variation coefficient. According to the obtained results it can be seen that there is no significant difference in litter size between these breeds of shepherd dogs.

Conclusion

By studying fertility parameters of Romanian shepherd dog Carpatin in relation to age of parents and breeding season, it was determined that there is no statistical importance of impact of these factors on the observed fertility parameters of this breed.

Obtained results coincide with data on Šarplaninac, Tornjak and Serbian shepherd dog, which are all breeds similar to Carpatin.

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