

A retrospective study on some reproductive parameters of German shepherd bitches in Kenya

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ABSTRACT

Data relating to reproductive parameters of German shepherd bitches were collected from registered German shepherd dog (GSD) breeders with information kept over a 15-year period (1982–1997). The information obtained was verified using the East African Kennel Club records. A total of 594 bitches from 280 breeders were recorded. From these, 798 heats were observed, 594 of which were used for breeding, resulting in 3592 puppies. The mean age at puberty was 519.0 ± 41 days. Heats occurred throughout the year, although significantly ($P < 0.05$) higher and lower incidences were observed in October and April respectively. Pregnancy significantly ($P < 0.01$) increased interoestrous interval, which was 247.8 ± 99.6 and 183 ± 52 days among bred/pregnant and non-bred bitches respectively. Most bitches in oestrus (73.7 %) were bred, and breeding was carried out throughout the year, with a distribution closely related to that of heat incidence. Subsequently, whelping occurred throughout the year, and 95.5 % of the bitches that were mated whelped. A mean gestation period of 60.6 ± 5.1 days was observed. The mean litter size was 6.4 ± 0.4 puppies, and did not differ significantly between months. The preweaning losses were low, with 2.3 % stillbirths, 0.9 % culls and 11.4 % mortalities.

Key words: German shepherd bitches, Kenya, reproductive parameters.

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INTRODUCTION

From earliest times the dog has figured prominently in human life. The relationship between dogs and people is sometimes so stringent that separation results in psychological depression to one or both. Early humans quickly recognised the dog's ability to complement those faculties in which they were weak. The dog could run, see and hear better and had a far more acute sense of smell than that of people⁸. These faculties are essential when there are predators, intruders and disasters like earthquakes and bomb blasts. In addition to protection, dogs provide companionship.

Kenyan society, like that of most developing countries, is becoming increasingly urbanised and individualistic owing to increasing use of family planning methods and economic pressures. Life has thus become either very lonely or insecure. Companionship and security are therefore vital, and the dog ably fulfils these roles.

There is need for a type of a dog that is intelligent and strong enough to fulfil the

above roles in Kenya. Of the vast number of dog breeds kept in this country, the German shepherd dog (GSD) is the most frequent companion and guard dog, and is popular with security firms, the police force and private homes. However, despite its popularity, its reproductive performance under Kenyan conditions has not been investigated. This paper is designed to provide this information, which is likely to be relevant elsewhere in Africa.

MATERIALS AND METHODS

Data collection forms were designed into a closed-format questionnaire (Appendix 1) and distributed to 280 randomly-selected GSD breeders in Kenya. These were from a sample frame of 400 purposely-selected breeders who were registered with the East African Kennel Club (EAKC) and kept proper records. Recruitment of this sample frame involved an initial survey of the kennels of breeders in Kenya. Only breeders with clear and well-entered records were recruited. Selection of the 280 of the 400 breeders was based on technical and logistical rather than statistical considerations. This random sample was considered to be the practical maximum that

could be covered in the data-collection phase. A random method was used to sample the 70 % to avoid bias caused by the wide geographical distribution of the breeders in Kenya. The purpose of the survey and requirements for completing the questionnaire were explained to each breeder. At the time of the visit, questions were designed to obtain information on the birth dates, length of bitch ownership, onset of all heats, number of bitches bred whenever they came into oestrus, breeding dates and method of insemination, whelping dates, litter sizes, status of puppy at birth and weaning rates and dates.

Subsequently, records were obtained from the East African Kennel Club (EAKC), the registering body, to verify all the information given by the selected breeders, except for the heats not used for mating. The results reported in this study covered a period of 15 years (1982–1997) and represent country-wide coverage.

In cases where the breeder had bought mature bitches, information was collected for only the cycles they had observed and recorded after acquiring them. Such bitches were also excluded from data used to investigate mean age at puberty, unless their birth dates had been recorded and given to the new owner. The records for bitches that had died were also investigated, provided they were complete and not earlier than 1982.

All information obtained from the questionnaire was entered into a database (D-BASE IV, Ashton-Tate, Torrance, California). Records were screened for proper coding, missing data and detection of outliers. The Statistical Analysis System (SAS) was used for descriptive statistics. Significance was tested for using 1-tailed Student's *t*-tests ($P < 0.05$ or $P < 0.01$) with regard to the month-to-month and inter-oestrous intervals, respectively.

RESULTS

Records were of 594 bitches, 60 % of which were patients of the Kabete veterinary clinic in Nairobi. The other 40 % were spread throughout the country. From these bitches, 798 heats, 594 matings, 567 whelpings and 3592 puppies were recorded. The breeders had been in

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business for as few as 3 years to as long as 20 years. Of these breeders, 10 % kept only GSDs, while the rest had mixed breeds in their kennels. The ages of these bitches ranged from 4 months to 8 years, with a mean age of 4 years. The number of GSD-bitches owned by the breeders ranged from 1 to 5, with a mean of 2 bitches.

First heat occurred on average at 519 ± 41 days (17.3 ± 1.4 months) of age, with a range of 180 to 750 days (6–25 months). However, 1 bitch reached puberty at 1000 days (33.3 months). Most (78 %) reached puberty between 13–18 months. Oestrus occurred throughout the year, although significantly ($P < 0.05$) higher and lower incidences were observed in October and April, respectively. Pregnancy significantly ($P < 0.01$) increased interoestrous interval, for it was 247.8 ± 99.6 in 594 bitches that became pregnant and 183.0 ± 52.5 in 204 that were not bred. This interval was for pooled bitches, and not for within-bitch cases. Most (73.6 %) of the bitches were mated whenever they came into oestrus. Mating was carried at any time of the year, dependent on the bitch's practical heat season. Pregnancy and subsequent whelping resulted from 95.5 % of the matings. The mean gestation length was 60.6 ± 5.1 days from the last day of mating, with a range of 54–68 days. The mean litter size was 6.34 ± 0.4 puppies with a range of 1–14 puppies. Of the puppies whelped, 76 (2.31 %) were stillbirths, 31 (0.94 %) were destroyed before weaning owing to undesirable traits, and 374 (11.37 %) died before weaning.

DISCUSSION

Surveys are commonly used for data collection, despite the fact that the method is open to criticism on the grounds that the results may be statistically biased owing to specific environmental influences. In the present study, an attempt was made to use only information provided by reliable breeders, validated by using the East African Kennel Club records. The fact that the bitches studied came from all parts of the country minimised the influence of environment on the parameters investigated.

The mean age at 1st heat (puberty) observed for the GSD bitches in Kenya is within the range reported by previous workers^{1,2,10,11,20,21,23,24}, but lies in the upper part of the range. The fact that the earliest age at which puberty was observed in this study was at 6 months suggests that management and environmental variation may be contributory factors to delayed mean age at puberty in Kenya compared to that of other large breeds of dogs as documented in temperate

countries^{1,2,10,11,20,21,23,24}. These factors may be nutritional and/or climatic. However, the extreme of 1000 days was unexpected, and probably was a case of neglect, either related to poor nutrition or poor heat observation.

All-year-round heat distribution with peak incidences in some months agrees with previous workers^{9,23,24} that bitches are non-seasonal breeders. Although it has been reported⁴ in the United Kingdom that bitches were seasonal breeders with higher breeding activity in the early months of the year (February to May), the results of this study differ. The hypothesis tested in the present study, that bitches in Kenya have 2 breeding seasons around the months of March and September, was not confirmed. The observation on which the hypothesis was based could have been due to the effect of a higher incidence of heats and pheromones in those months, since when a bitch is on heat, she is followed by many wandering dogs^{5,6,11,18}, a situation likely to attract attention and thus create an impression of seasonality. It was not clear why some months in the present study showed high and low incidence of oestrus. Other workers^{9,23,24} have also observed differences in heat incidence in different months of the year. It has also been suggested that, although bitches are non-seasonal breeders, they exhibit differences in interoestrous intervals and in peak oestrous activity during different months of the year depending on locality^{3,9,11,23,24}. In this study, oestrus occurred variably at 6-month intervals in GSD bitches in Kenya. The repeatability therefore might have depended on which month the particular bitch attained puberty, unless otherwise interrupted by some form of stress or pregnancy.

The statement that pregnancy significantly disrupts regularity of oestrus and lengthens interoestrous period agrees with previous studies^{9,13,15}. However, the interoestrous interval reported in this study does not refer to individual bitches but to bitches pooled together. Although a statistical comparison is not possible, a higher coefficient of variation is expected in the results of this study¹³. The present study, like previous studies⁹, suggests that there is need to investigate mechanisms regulating various phases of the oestrous cycle in the bitch.

The gestation period of 60.6 ± 5.1 days agrees with results of previous workers^{10,11,21,23,24}. The bitches also revealed high conception rates (95.5 %). Although fertility depends on many factors, such as the ability to time breeding and male fertility, the results of this study, while apparently higher than previously reported,

agree with those of earlier studies^{7,14}. The high conception rate observed in this study might be attributed to the fact that the bitches were bred naturally and for all the days in oestrus as long as they would accept the male. The fertility of the dogs used by the breeders was apparently high. This is expected because the breeders are in a competitive business, meaning they had to select a male of known high performance. The average litter size of 6.4 puppies reported in this study agrees with other workers^{14,22}. Litter size is highly correlated to optimum timing for breeding¹⁴. In this study, a lower litter size than previously reported^{16,21} (7.96 and 7.01, respectively) was recorded, but a statistical comparison was not possible, the difference might not be significant. The sample size was smaller than that of the 2 previous studies. The high conception rate (95.5 %) in this study suggests that the bitches were bred at the right time. Breeders are in business to produce show, companion or guard GSDs in Kenya. If according to their judgement a particular puppy showed a tendency to be unsuitable for its intended purpose, it was destroyed before weaning. The observed stillbirth rate of 2.3 % and pre-weaning mortality of 11.4 % agree with reports from other countries^{12,13,17,19,25}. The pre-weaning culling rate of 0.9 %, although not previously reported for GSD puppies, is similar to that reported for the beagle¹. The pre-weaning puppy losses are low, suggesting a high degree of breeding perfection in GSD breed-lines in Kenya.

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Appendix 1

Details of data gathered.

Client details

- (i) Name
- (ii) Address

Details of the bitch

- (i) Name
- (ii) Birth date
- (iii) Date of first heat
- (iv) Subsequent heat dates
- (v) Breedings
 - (a) Heat bred
 - (b) Breeding dates
- (vi) Whelpings
 - (a) Date whelped
 - (b) Number of puppies born alive
 - (c) Number of puppies born dead
- (vii) Weanings and cullings
 - (a) Birth date
 - (b) Date and number culled
 - (c) Date weaned
 - (d) Number of puppies weaned