I. INTRODUCTION

Among domestic animals, the dog has peculiar reproductive biology. The bitch is monoestrus, ovulates only once or twice a year, at 5-12 months interval, has prolonged estrus period and eggs are ovulated as primary oocytes, which only undergo maturation after one or more days in the oviduct. Further, canine spermatozoa have a prolonged survival time in the genital tract of the bitch (Concannon et al., 1983).

In recent years, canine breeding has rapidly developed into an organized and highly lucrative industry and consequently, there has been a tremendous increase in breeding of pedigreed dogs with breeders even importing dogs at fancy prices. It is therefore, natural that the breeder expects the maximum returns for his investments and frequently approaches the veterinarian for his advice on various aspects of canine breeding. As the day of parturition constitute the most anxious time for a canine breeder, one of the clinical services most commonly sought by the owner is the determination of the gestational age and prediction of parturition date.

Determination of gestational age and prediction of parturition date could be important for both the breeder and for veterinary obstetrician. From breeder point of view, determination of gestational age and prediction of parturition day provide him the information for scientific management of the pregnant bitch and to make adequate preparation for whelping. Accurate prediction of parturition date could be extremely useful to the obstetrician in making decisions regarding elective caesarian section by providing a date at which a pregnancy can be safely considered full term. Further, accurate determination of the expected parturition date will allow clinicians to document
premature births and determine the earliest premature delivery date that is compatible with puppy survival. Prediction of gestational age and parturition date, however, can be extremely difficult. In many of the breeding establishments, matings are either predetermined by the owners or by veterinarian on the basis of vaginal exfoliative cytology. In other cases, the breeding may be unplanned. Further, in many cases, matings are generally multiple. Under these circumstances/practices, the whelping are reported to occur over a wide range of 57-72 days (Concannon et al. 1983; Concannon, 1986; Moiser, 1986), making it extremely difficult to predict the parturition date accurately. The apparent wide variations in the canine gestation length is reported to be due to the long period of receptivity of the bitch, the great individual variations between onset of estrus and ovulation and the long survival of sperms in the uterus of estrus bitch. (Doak et al., 1967; Evans, 1974; Holst and Phemister, 1974; Holst and Phemister, 1975; Wildt et al., 1978; Concannon and Rendano, 1983; and Johnston et al., 1988).

In recent years, researches in small animal reproduction have attempted to provide newer methods to assess the gestational age and predict the probable date of parturition. The day of luteinizing hormone (LH) surge has been stated to be an extremely reliable physiological event in canine reproduction by which ovulation, oocyte maturation, implantation, fetal development and parturition can be determined (Kutzler et al., 2003). Canine gestation length timed from the day of luteinizing hormone surge showed very little variation (Concannon et al., 1975). However, in a clinical setup, prediction of parturition date which focuses on the identification of luteinizing hormone surge during the mating time, could be expensive and time consuming and therefore, is generally not preferred by the practicing clinician.
The studies of Concannon et al., (1975) demonstrated that changes in the serum progesterone concentrations during the later part of proestrus and that of estrus was characterized by a gradual increase with a sudden sharp rise which coincided with luteinizing hormone surge. In the same study, the initial rise in serum luteinizing hormone and progesterone could not be dissociated and in a later study the findings were supported (Concannon et al., 1975). Thus, the preovulatory rise in serum progesterone levels have shown to be a reliable physiological landmark for prediction of the parturition date at the time of mating.

In human obstetrics, ultrasonography has been widely used to determine the gestational age, assess the fetal wellbeing and predict the date of labor. Transabdominal ultrasonographic examination also has a wide scope for its application in small animal obstetrics. Ultrasonography has been particularly useful in early pregnancy diagnosis (England et al., 1990; Yeager and Concannon, 1990; Yeager et al., 1992; England and Yeager,1993). It has also been used for estimation of gestational age and prediction of litter size and date of parturition (Concannon, 2000; Kutzler et al., 2003). However, concerns have been raised regarding the accuracy of prediction of parturition date in bitches, in view of the wide range of their body size. Clearly, there is a need to assess the efficacy of ultrasonographic methods for predicting the parturition date, taking into consideration, the body size of different breeds.

The present study was therefore planned to evaluate the efficacy of various methods for accurate prediction of parturition date in bitches. The specific objectives of the study were,
1. To determine the accuracy of prediction of parturition date in bitches on the basis of initial rise in preovulatory serum progesterone concentration.

2. To assess whether measurements proposed to predict gestational age and days before parturition based on ultrasonic measurements of the fetus are applicable irrespective of the breed of the animal.

3. To establish the progressive changes in gestational sac and fetal head diameter at various stages of gestation in Mongrel bitches.

4. To assess whether physical and behavioral changes in the pregnant bitches are useful in predicting the parturition date and

5. To study the reliability of drop in prepartum rectal temperature for predicting the date of parturition.