

## OESTRUS DETECTION IN THE NIGERIAN MONGREL BITCH: APPLICATION OF VAGINAL CYTOLOGY

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### ABSTRACT

Vaginal smears from 45 multiparous Nigerian Mongrel bitches in proestrus (n=10), oestrus (n=22) and pregnancy (n=13) were examined. Differential cell count of exfoliated vaginal epithelial cells showed that the mean percentage of superficial cells was 95 in oestrus, 65.5 in proestrus and 15 in pregnant bitches. Oestrus smears were characterized by the presence of predominant superficial cells. The phase of predominance of superficial cells (>90%) was consistent with the phase of high vaginal mucus electrical resistance measurements and sexual activity. It is therefore concluded that vaginal cytology can be applied in the detection of oestrus in the Nigerian Mongrel bitch.

**Key Words:** Mongrel bitch, Oestrus, Vaginal cytology

### INTRODUCTION

The vaginal epithelium of the bitch is characterized by cyclic cellular changes that occur as a result of changing secretory patterns of reproductive hormones, particularly oestrogen. These vaginal changes can be determined through exfoliative vaginal cytology (Priedkalns, 1981; Olson *et al.*, 1984a; Wright and Parry, 1989). There also exists a relationship between behavioural events, hormonal and physiologic changes in the bitch, although, many bitches still show variation from these parameters. It is reported that some bitches experience a very short or indiscernible proestrus and will allow mating as soon as, or shortly after, the owner notices the bitch entering her season; while some have no discernable proestrus or oestrus, yet they ovulate normally (Olson *et al.*, 1984b). It is therefore, important to know when bitches enter and leave oestrus so that they are not inappropriately mated (Olson and Hosted, 1986).

Vaginal cytology has been described as a useful diagnostic tool in staging oestrus and in the determination of the optimal time to present a bitch to a stud dog for mating in several exotic breed (Olson *et al.*, 1984b; Olson and Hosted, 1986; Wright and Parry, 1989). In Nigerian, little work has been characterizing the cellular changes in the Mongrel bitch. This paper, therefore, describes the vaginal cytologic patterns of the Nigerian Mongrel bitch in proestrus, oestrus and pregnancy.

### MATERIALS AND METHODS

Forty five multiparous Nigerian Mongrel bitches in different stages of the reproductive cycle, presented to the small animal clinic of the Veterinary Teaching Hospital of the University of Maiduguri Nigeria, for routine check-ups were used in this study. These bitches were diagnosed to be in proestrus (n=10), oestrus (n=22) and pregnancy (n=13) based on history, behavioural signs, physical examination and vaginal mucus electrical resistance measurements.

The bitch was adequately restrained on an examination table and the perivaginal area was scrubbed with a potent antiseptic. Vaginal smear was collected by the adoption of the method described earlier (Holt, 1986). For this purpose, vulvar lips were parted and a small column (1ml) of physiologic saline solution, drawn into a blunt-ended clean glass pipette with a rubber bulb, was introduced into the cranial vagina, carefully avoiding the urethral orifice. Exfoliated vaginal epithelial cells were then collected by squeezing the bulb quickly and gently. The pipette was withdrawn and the aspirate smeared onto a clean pre-labelled glass slide, air dried, fixed in methanol and then stained with Giemsa (Hewitt, 1984). Stained smears were then examined microscopically and interpreted, following Olson *et al.* (1984a).

## RESULTS

Differential cell counts of the exfoliated vaginal epithelial cells from 45 vaginal smears are shown in Fig. 1. Results revealed a high mean percentage of superficial cells (65.5) in proestrus bitches, smears were characterized by the presence of massive erythrocytes and very few leucocytes (Fig. 2a). Bitches in this stage also exhibited swollen vulva with a history of bloody vaginal discharge prior to presentation to the clinic.

Bitches in oestrus had a mean superficial cell count of 95%. Some smears showed scanty erythrocytes with a clear smear background (Fig. 2b). A mean superficial cell count of 15% was recorded in pregnant bitches, with a dirty smear background (Fig. 2c). Other epithelial cells (parabasal and intermediate) showed a mean of 35% in proestrus, 40% in pregnancy and 70% in oestrus (Fig. 1).

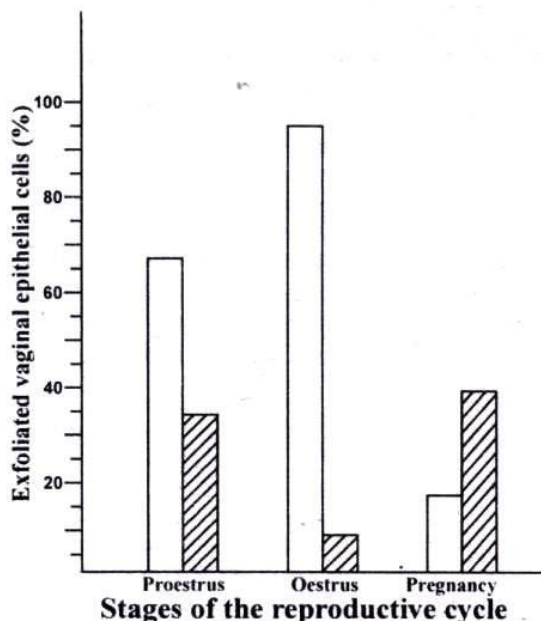
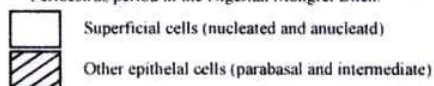


Fig 1 Mean percentages of exfoliated vaginal epithelial cells during the Perioestrus period in the Nigerian Mongrel Bitch.



## DISCUSSION

Results of this study showed that superficial epithelial cells in the vaginal smears of the Mongrel bitches increased with transition from proestrus and peaked during oestrus, with a mean of 95%. This period of high concentration of superficial cells in vaginal

smears is the period of high sexual activity and fertility in bitches. This agrees with a previous report (Olson *et al.*, 1984a). Vaginal mucus electrical resistance measurements were also previously reported to be highest during this period in the Mongrel bitch (Mshelia and Amin, 2000). This shows that with the onset of proestrus, there is a proliferation of the vaginal epithelial cells which peaks during oestrus, with a resultant concentration of superficial cells in the vaginal smear. This proliferation of epithelial cells during this period is in response to the stimulating effect of secretory oestrogens on the vaginal mucosal cells (Klotzer, 1974).

During pregnancy, superficial cell counts in vaginal smear were found to drop drastically (15%), with a corresponding increase in cells of the deeper layer (40%) and a rise in serum progesterone levels above 5ng/ml. Although non-pregnant dioestrus smears were not observed in this study, however, it has been reported previously that no significant change was observed in the smears of pregnant and non-pregnant dioestrus bitches (Moller *et al.*, 1984). It was also reported that there is no significant difference in the progesterone levels of pregnant and non-pregnant dioestrus bitches (Conconnon and Lein, 1989). This may partly explain the occurrence of the similarity in their smear pictures.

This study shows clearly that superficial cells are highly concentrated in the vaginal smears of oestrus Mongrel bitches than during proestrus or pregnancy. This finding is consistent with previous reports (Holt, 1986; Olson and Hosted, 1986; Wright and Parry, 1989; Conconnon and Lein, 1989). It is, therefore, concluded that vaginal cytology can be applied in the detection of appropriate time to present the Mongrel bitch for mating.

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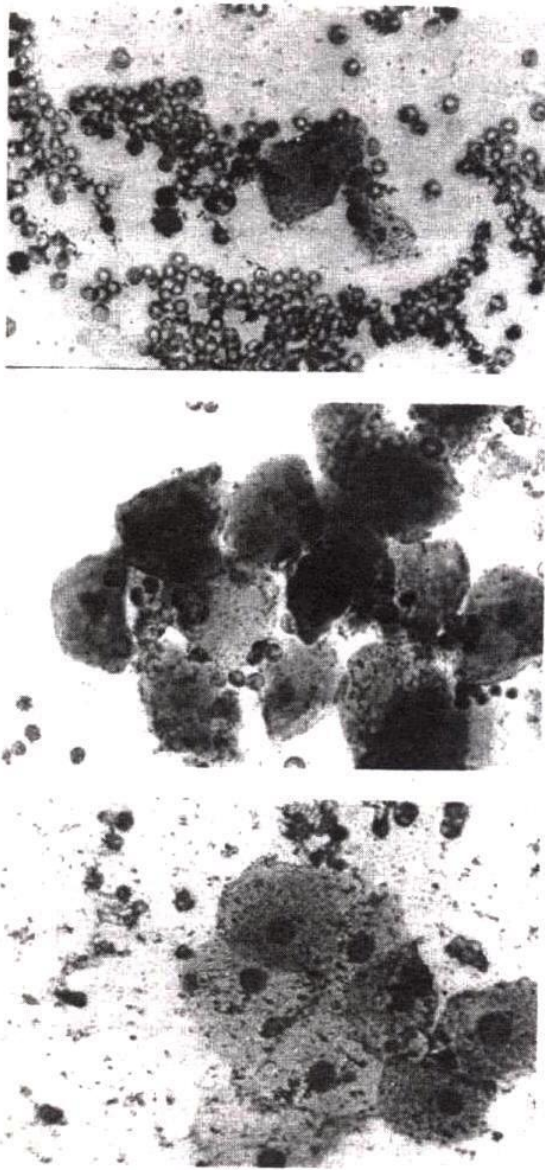


Fig. 2. Vaginal smears of bitches during proestrus (A) oestrus (B) and pregnancy (C). Note proestrous smear with characteristic massive erythrocytes and oestrus smear with predominant superficial cells and a clear smear background.

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