

Influence of Buffalo Dams Reproductive Status on Sexual Hormones Activity in Bulls

Pelagalli Alessandra, d'Angelo Danila, Mastellone Vincenzo, Lombardi Pietro, Avallone Luigi, Zicarelli Gaspare, Sattar Abdul and Zicarelli Luigi

Dipartimento di Strutture, Funzioni e Tecnologie Biologiche, Università di Napoli Federico II, Napoli, Italy (PA, d'AD, LP AL), Dipartimento di Medicina Sperimentale e Clinica, Università Magna Græcia, Catanzaro, Italy (MV), Dipartimento di Scienze Zootecniche e Ispezione degli Alimenti, Università di Napoli Federico II, Napoli, Italy (ZG, ZL), and Department of Theriogenology, University of Veterinary and Animal Sciences, Lahore, Pakistan (SA)

Abstract.- Buffaloes have a seasonal reproductive activity and it has been reported that bulls show a decrease of libido during anoestrus in those farms where coupling is allowed all over the year. In order to investigate the levels of androstenedion, estrone, testosterone, dihydrotestosterone, estradiol and estrone/estradiol ratio have been evaluated in bulls at different times of seasonal reproductive activity. Thirty buffalo bulls were included in the trial and divided in two age groups (>7 years and 3-5 years). Hormone assay was performed in duplicate by ELISA and statistically analysed by Student's 't' test. Analysis of data showed interesting results concerning the month and age effects as well as the combination of the two variables.

Key words: Buffalo, reproduction, sexual hormones.

INTRODUCTION

The reproductive activity of buffalo cows in Italy is considered season linked and under photo periodic control, as can be inferred from unequal distribution of the spontaneous sexual activity and of the births throughout the year. In the extensive traditional breeding the cyclic ovarian activity is mainly high in late summer and autumn, while during spring an early summer it is very low (Zicarelli, 1997).

The available data on the endocrine activity in buffalo bulls are notably scarce but, as in other species, a reproductive seasonality seems to exist in the buffalo males: seasonal variations of libido, sexual performance, testis weight, semen characteristics, testosterone levels were repeatedly reported, but the presented data often offer marked discordances, probably due to the different breeds and environments (Dixit *et al.*, 1985). Such discordance is also due to the fact that semen evaluation is often performed on bulls from reproductive centres which, having libido and mounting show good semen quality.

It is also well known that, in presence of female oestrous, poor libido in bulls could induce, non only ipofertility in farm animals, but also aggressiveness and fight accompanied often by severe wound injure in testicle and mammary gland.

The aim of this study was to monitor the male sexual hormone pattern during different times in which fertility vary by little (April) to medium (February) to optimal (November).

MATERIALS AND METHODS

Animals

This study was carried on thirty buffalo bulls on farm situated in Campania region. The animals were divided in two groups according to age (>7 years and 3-5 years) fed under conventional feeding. All the bulls were normally used for breeding and were confirmed to be fertile.

Collection of samples

Blood samples were collected by venipuncture from the jugular vein between 8.00 and 11.00 h during all the phases of dam estrous cycle. The samples were collected in vacutainers without anticoagulant. Blood samples were allowed to clot at 4°C then serum was harvested by centrifugation at 2000 g for 30 min. Serum was stored at -20°C until all samples were assayed together.

* Corresponding author: Sattar Abdul Department of Theriogenology, University of Veterinary and Animal Sciences, Lahore, Pakistan.

Table I.- Serum concentrations of androstenedion, estrone, testosterone, dihydrotestosterone, estradiol and estrone/estradiol in function of the of blood collection.

Blood collection (time)	Testosterone (ng/ml)	Dihydrotestosterone (pg/ml)	Androstenedion (ng/ml)	Estrone (pg/ml)	Estradiol (pg/ml)	Estrone/estradiol
February	2,37	487	0,56A	116A	27,73	4,17a
April	1,82	682	0,36B	770B	25,73	29,93b
November	2,73	674	0,45AB	882B	30,63	28,73b

a, b, $P < 0.01$.

Table II.- Serum concentrations of androstenedion, estrone, testosterone, dihydrotestosterone, estradiol and estrone/estradiol in function of the age of the bulls.

Animal age	Testosterone (ng/ml)	Dihydrotestosterone (pg/ml)	Androstenedion (ng/ml)	Estrone (pg/ml)	Estradiol (pg/ml)	Estrone/estradiol (pg/ml)
> 7 year	3,24 a	765 a	0,52 a	490	27,72	17,67
3-5 year	1,86 b	501 b	0,43 b	595	28,88	20,59

a, b, $P < 0.05$.

Hormone determination

Evaluation of androstenedion, estrone, testosterone, dihydrotestosterone and estradiol was performed by enzyme immunoassay. Serum samples (50-100 μ l) were used for each determination according to the different hormone determination. The concentration of each hormone was performed in duplicate by spectrophotometric determination at 450 nm by using a plate reader (Bio-Rad mod. 550). Results expressed as mean \pm standard deviation (SD) were statistically analysed by using Student's 't' test.

RESULTS

Mouth effect

Androstenedione levels were statistically ($P < 0.01$) more high in February than in April as shown in Table I. No differences were observed between November and the other two mouths. Estrone/estradiol ratio was lower in February than values observed in the other two mouths.

Age effect

Higher ($P < 0.05$) levels of androstenedion, testosterone and dihydrotestosterone were found in older bulls (Table II) particularly observed during the month of February.

DISCUSSION

The obtained results demonstrate interesting aspects related to fertility. In particular, androstenedion concentration observed during the month of April showed lower values demonstrating a reduced steroidogenic activity specific of this period associated with a reduced sexual activity. The reduced estrone/estradiol ratio observed in February demonstrates that during the male anoestrous, androstenedion synthesis isn't modified as well as for dihydrotestosterone and estradiol. Variations in hormone levels in function of season are in agreement with data reported by Javed *et al.* (2000) suggesting an active control of sexual activity by hypothalamus-pituitary axis. The observed influence of age on the pattern of sexual hormones was not accompanied by data on field (data not shown). Obtained data suggest interesting information on sexual activity of buffalo bull and on the possible influence on season and age. Data require other studies in order to increase the knowledge of specific physiological mechanisms underlying the reproductive function of buffaloes.

ACKNOWLEDGEMENT

Supported by the grant FISIR 2005 from MIUR, Roma, Italy.

REFERENCES

- DIXIT, N.K., AGARWAL, S.P., AGARWAL, V.K. AND DWARKANHATH, P.H., 1985. Seasonal variation in serum levels of steroid hormones and their relation with seminal quality and libido in buffalo bulls. *Theriogenology*, **24**: 293-303.
- JAVED, M.T., KHAN, A. AND MUMTAZ, A. 2000. Influence of season on seminal plasma testosterone and oestrogen in healthy and abnormal buffalo bulls and their relationship with other semen parameters. *Vet. Archiv.*, **70**: 141-149.
- ZICARELLI, L... 1997. Reproductive seasonality in buffalo. *Proce. Third course on biotechnology of reproduction in buffaloes (Issue II)*, Caserta, Italy. October. 6-10, pp. 29-52.