



Management of delayed puberty in Marathwadi buffalo heifers with special reference to metabolic and haematological profile

U B KUMBHAR¹, KANCHAN THORAT², S S GHOKHE³ and K S CHAUDHARI⁴

Maharashtra Animal and Fisheries Sciences University, Nagpur, Maharashtra 440 006 India

Received: 17 December 2010; Accepted: 5 September 2011

Key words: Buffalo heifer, Conception, Management, Mineral supplementation, Puberty

Delayed sexual puberty and maturity in buffalo heifers is one of the major reproductive problems commonly found under village managemental conditions (Gupta *et al.* 1994). Venkata Naidu *et al.* (2009) reported combination of mineral supplementation and hormonal therapy for induction of oestrus and conception rate in delayed pubertal buffalo heifers. Similarly Markandaya *et al.* (2009) also used combined therapy of herbal heat inducer along with haematinic preparation for induction of oestrus in buffalo heifers under field conditions. In the present study, mineral supplementation effect on initiation of ovarian cyclicity in Marathwadi buffalo heifers with special reference to metabolic and haematological parameters were investigated.

The present study was carried out on 20 delayed pubertal graded Marathwadi buffalo heifers aged between 4 to 5 years during non-breeding season and had not shown any pubertal oestrus, having disease free health and reproductive tract. Before initiation of treatment, all the heifers were gynaecologically examined per rectally, thrice a week. Farmers were advised to feed all the animals included in the present study with 1 kg of concentrate along with 100g sprouted grains daily for 7 days and observe for the onset of oestrus. The treatment trial was conducted in 10 Marathwadi buffalo heifers (group 1) treated with chelated mineral mixture @ 50g daily for 20 days. Six healthy buffalo heifers served as healthy control (group 2).

Haematological estimation were carried out in 16 Marathwadi buffalo heifers before and after completion of treatment, blood was collected from only 10 Marathwadi buffalo heifers in treatment and control group on fully automated haemolyser. From each animal, 10 ml of blood was collected by venepuncture, of which 1 ml was transferred

to vial containing sodium citrate for hemoanalysis and remaining was used for serum separation to estimate biochemical parameters. Biochemical evaluation included estimations of calcium, phosphorous and iron using standard diagnostic kits in semiautomated biochemical analyzer.

The buffalo heifers in oestrus were examined per-rectally to confirm the oestrus signs. The heifers were artificial inseminated with French mini frozen semen straw and pregnancy was confirmed by per rectal examination after 3 months. Statistical analysis was carried out as per Snedecor and Cochran (1994).

The effect of treatment on induction of oestrus and conception rates in delayed pubertal Marthwadi buffalo heifers were shown in Table 1. Out of 10 treated buffalo heifers 9 (90%) exhibited oestrus after the treatment and overall 7 (70%) buffalo heifers were conceived in the treatment group, out of 6 buffalo heifers only 1 (16.66%) heifer exhibited oestrus with overall conception rate 1 (16.66%) in control group. Singh *et al.* (2006) reported similar conception rate in animals supplemented with minerals. Overall conception rate recorded in the present study was higher when compared with conception rate recorded by Venkata Naidu (2009). The level of haemoglobin was significantly increased ($P < 0.05$) against pre treatment level in treatment group. Ramkrishna (1997) reported low

Table 1. Induction of oestrus and conception rate

Parameters	Treatment	Control
Number of heifer treated	10	6
<i>Number of heifers exhibited estrus after treatment</i>		
Within 10 days	4	1
11–20 days	3	0
21–30 days	2	0
Total	9 (90%)	1 (16.66%)
<i>Conception rate</i>		
Conception rate at induced oestrus	5	1
Conception rate at subsequent heat	2	0
Overall conception rate	7 (70%)	1 (16.66%)

Present address: ¹Subject Matter Specialist (drumeshk@indiatimes.com), ²M.V.Sc. Scholar (kanchanthorat@rediffmail.com), Department of ARGO; ³Assistant Professor (survet@rediffmail.com), Department of Preventive Medicine; ⁴Assistant Professor (kscvet@gmail.com), Department of Veterinary Surgery and Radiology.

Table 2. Mean haemato-biochemical profile in buffalo heifers

Parameters	Treatment (n=10)		Control (n=6)
	BT	AT	
Hb (g/dl)	9.48±0.74	11.88±0.90*	13.45±0.71 ^{NS}
PCV (%)		31.61±1.82	36.42±2.87*
38.78±0.89 ^{NS}			
TEC (× 10 ⁶)	7.81±0.65	8.14±0.28 ^{NS}	8.57±0.12 ^{NS}
TLC (× 10 ³)	8.39±0.91	8.35±0.51 ^{NS}	6.70±0.61 ^{NS}
MCV (fl)	39.39±2.64	41.59±3.43 ^{NS}	41.39±0.51 ^{NS}
MCH (pg)	12.84±1.23	13.59±1.81	14.56±0.81 ^{NS}
MCHC (%)	33.50±0.31	34.38±0.84 ^{NS}	34.54±0.33 ^{NS}
Calcium (mg/dl)	6.49±0.26	9.59±0.35**	11.33±0.65 ^{NS}
Phosphorus (mg/dl)	3.61±0.20	5.75±0.39**	5.21±0.31 ^{NS}
Iron(µg/dl)	99.60±2.57	103.71±3.65**	112.54±0.77 ^{NS}

NS, non significant; *, significant (P<0.05); **, highly significant (P<0.01).

level of haemoglobin in anoestrus crossbreed Jersey cows and further concluded that low haemoglobin levels can influence the tissue oxygenation of reproductive tract and can influence cyclicity.

The serum calcium and phosphorous level (Table 2) recorded in this study were less than those reported by Singh *et al.* (2006) and Venkata Naidu (2009). While the serum iron concentrations were highly significantly increased (P<0.05) in treatment group. Roberts (1971) reported that low iron could cause anaemia, debility, lack of appetite and failure of estrus. Vadnere and Singh (1989) reported significantly lower level of iron in anoestrus crossbreed cows than that of normally cycling cows. In present study, animals supplemented with iron preparation has been found to be very useful for induction of estrus. The low serum mineral concentration might be due to primarily feeding of only sorghum straw in this area under study which results in delayed puberty and maturity.

SUMMARY

During non-breeding season, 20 delayed pubertal graded Marathwadi buffalo heifers aged between 4 to 5 years that had not shown pubertal oestrus having disease-free health and reproductive tract studies were used in the present study. Randomly heifers were divided in 2 groups — treatment group (10) were treated with chelated mineral supplement

and control group (6) animal without treatment. The mean haemato-biochemical values of serum calcium, phosphorous and iron value in treatment group were 6.49±0.26 mg/dl, 3.61±0.20 mg/dl, 99.60± 2.57 µg/dl and 9.59±0.35 mg/dl, 5.75±0.39 mg/dl, 103.71± 3.65 µg/dl were reported before and after treatment, respectively. While the mean of serum calcium, phosphorous and iron value in control group was 11.33±0.65 mg/dl, 5.31±0.31 mg/dl and 112.54± 0.77 µg/dl respectively. Out of 10 treated buffalo heifers, 9 (90%) heifers exhibited oestrus after the treatment and overall conceived buffalo heifers were 7 (70%) in the treatment group, while in control group out of 6 buffalo heifers only 1 (16.66%) heifer exhibited oestrus with overall conception rate 1 (16.66%). The fertility in delayed pubertal buffalo heifers under village managerial condition could be enhanced with mineral supplementation and good managerial practices in the Marathwada region.

REFERENCES

- Gupta B P, Kaushik S N and Mishra R R. 1994. Study on reproductive parameters of Murrah buffaloes. *Indian Journal of Dairy Science* **47** (4): 257–65.
- Markandeya N M, Patil A D and Bharkad G P. 2009. Biochemical profile of *Deoni* cows supplemented with haematinic and iron for induction of oestrus. *Indian Journal of Animal Reproduction* **30** (2): 54–56.
- Ramkrishna K V. 1997. Comparative study on certain biochemical constituents of anoestrus crossbred jersey rural cows. *Indian Journal of Animal Reproduction* **1**: 33–35.
- Roberts S J. 1971. *Veterinary Obstetrics and Genital Diseases* 2nd edn. CBS Publishers, India.
- Singh A P, Sah R S, Singh R B, Akthar M H, Roy G P, Singh C and Kunj V. 2006. Response of mineral mixture, prajana and GnRH on serum biochemical constituents and conception rate in anoestrus buffalo. *Indian Journal of Animal Reproduction* **27**(1): 51–54.
- Snedecor G W and Cochran W G. 1994. *Statistical Methods*. 8th edn. Iowa State University Press, Ames, Iowa.
- Vadnere S V and Singh S. 1989. Blood plasma levels of iodine calcium, Inorganic phosphorus, copper and iron in postpartum anoestrus crossbred cows. *Indian Journal of Animal Reproduction* **10**: 145–46.
- Naidu V, Srinivas G, Hari Krishna M N V V and Devi Prasad V. 2009. Management of delayed puberty in graded murrah heifers under field conditions – A practical approach. *Buffalo Bulletin*. **28**(4): 204–06.