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Research Article

Economical Analysis of the Estimated Cost of Management of Anestrus Buffaloes under Field Conditions Using Different Hormonal and Non–Hormonal Strategies

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ABSTRACT

In India, buffalo has eminent position among the milk producing animals but its poor reproductive efficiency due to ovarian inactivity leads to economic losses that include lowered production as well as additional cost of rearing. A total of 175 anestrus buffaloes were selected on the basis of history, gynaeco–clinical examinations and serum progesterone estimation and treated with different hormonal (PMSG and Insulin) and non–hormonal (deworming plus mineral mixture supplementation) preparations to evaluate cost effective management of true anestrus in buffaloes. After treatment, all the animals were observed carefully for expression of estrus and the time taken for onset of estrus following withdrawal of treatment. The approximate economical loss per animal per day due to anestrus (Rs. 372.90) was also calculated for non–productive buffaloes. The results of estrus induction and cost incurred on different treatment protocols revealed that group IV (PMSG and Insulin along with deworming and mineral mixture supplementation) was found superior in terms of response to treatment as compared to other groups. However, treatment cost incurred in a group, in which deworming and mineral mixture supplementation was given, found to be most economical (Rs. 61.00). Therefore, it is recommended that different strategies may be used for the effective management of postpartum anestrus buffalos as per the need of situation.

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INTRODUCTION

Buffalo is the premier milk–producing animal of India, contributing about half of the total milk production of the country (18th Livestock census). It also plays significant role as draught and meat animal. Indian buffaloes mostly suffer from delayed puberty, anestrus, sub–estrus, summer infertility, prolonged intercalving interval and postpartum uterine disorders (Agarwal et al., 2005) affecting adversely the reproductive efficiency and thus production potential of buffaloes. Anestrus and sub–estrus are the major reproductive disorders of buffalo which increases the intercalving interval, reduces net calf crop and thus responsible for huge economic losses to the dairy industry. The major factors causing the anestrus in postpartum buffaloes are delayed resumption of ovarian activity after parturition due to suckling, high production potential, negative energy balance, nutritional deficiency, poor body condition score (BCS) and season (El. Wishy, 2007). In India, incidence of anestrus has been reported between 9.18–82.50% (Kumar and Kumar, 1995; Tomar et al., 2002, Nanda et al., 2003; Prajapati et al., 2005; Khan et al., 2009; Kumar et al., 2013; Thakor and Patel, 2013) whereas sub estrus varies from 3–73% in postpartum buffaloes (Narasimha Rao and Sreemannarayana, 1982; Shah et al., 1990; Kumar et al., 2013). Pawshe et al. (2011) reported an estimated loss from anestrus in cattle around Rs.193.00 per cow per day, however; as such reports on economic losses are meager in buffaloes. In general most of the farmers of the country are unaware about such losses from anestrus. Various hormonal and non–hormonal treatments have been tried (Xu et al., 1997; Mwaanga et al., 2004) for the management of anestrus in cattle and buffaloes with variable success rate depending upon the causative factors and field and farm conditions. As such no single panacea are available for the correction of anestrus condition in cattle as well as buffaloes. In present study, different strategies for the management of postpartum anestrus has been tried in the buffaloes in Jabalpur district of Madhya Pradesh and the cost incurred on the treatments also calculated in order to find out cost effective therapy.

MATERIALS AND METHODS

Selection and Management of Experimental Animals

A total of one hundred and seventy five (n=175) true anestrus buffaloes were selected for the study both from organized dairy farms and rural areas where buffaloes are reared mostly by grazing practices. The true anestrus was confirmed by history, two successive per–rectal examinations at 10 days interval (with the absence of palpable follicle(s) and corpus luteum) and serum progesterone estimation (<1ng/ml). In organized dairy farms, buffaloes were maintained at standard feeding practices. Clean drinking water was made available to the animals *ad lib.* Attempts were made to maintain the

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managemental practices identical throughout the period of study. The study was conducted during the period of 2011–2012.

Experimental Design

The selected buffaloes were randomly divided into seven groups, each comprising of twenty–five (n=25) animals. The treatments were given as per the following schedule (Table 1).

The standard cost that has been taken in to consideration for treatment includes: Insulin (Injection Human Mixtard, Abbott India Limited, 10ml @ Rs. 395), PMSG (Injection Folligon, Intervet, 1000 IU @ Rs. 570), Fenbendazole (Bolus Fentas, Intas Animal Health Care, 3g @ Rs. 40) and Mineral Mixture (Powder Gwala, Zydus AHL, 10kg @ Rs. 420).

Table 1: Division of groups and treatment schedule

Groups	Treatments protocols
G I	Deworming (day 0) + Min. mix. supplementation for 10 days (day 1–10), served as control
G II	Deworming (day 0) + Min. mix. supplementation for 10 days (day 1–10) + 500 I.U. PMSG, I/M, single dose (at day 10)
G III	Deworming (day 0) + Min. mix. supplementation for 10 days (day 1–10) + insulin@ 0.25 IU/Kg b.wt, S/C, OD for 5 consecutive days (day 10 to 14)
G IV	Deworming (day 0) + Min. mix. supplementation for 10 days (day 1–10) + 500 I.U. PMSG, I/M, single dose (at day 10) + insulin @ 0.25 IU/Kg b.wt, S/C, OD for 5 consecutive days (day 10 to 14)
G V	500 I.U. PMSG, I/M, single dose (day 0) + insulin @ 0.25 IU/Kg b.wt, S/C, OD for 5 consecutive days (day 0 to 4)
G VI	500 I.U. PMSG, I/M, single dose (day 0)
G VII	Insulin @ 0.25 IU/Kg b.wt, S/C, OD for 5 consecutive days (day 0 to 4)

Estrus Detection

After treatment, all the animals were observed for expression of estrus. The induction of estrus was detected by careful visual observations; however, bull parading was also done daily in the morning and evening in organized herds. Further, confirmation of estrus was done by per rectal examinations. The time taken for onset of estrus following withdrawal of treatment was recorded.

Calculation of Economic Loss Due to Anestrus

The detailed expenditure on feeding, housing, animal health care and profit of milk yield was recorded for calculation of approximate losses due to anestrus in dairy buffaloes reared in and around Jabalpur. The approximate economical losses per animal per day due to anestrus were calculated by deducting the cost of rearing from income generated by selling of milk, if animals were in production.

Blood Collection and Progesterone Estimation

About 5 ml of blood was collected aseptically from all the selected animals before the start of treatment. Serum was separated and progesterone was estimated by using ELISA kit (DSI S.r.l, Saronno, Italy).

STATISTICAL ANALYSIS

Statistical analysis was done by chi square test and one way analysis of variance (ANOVA) to compare the effects of hormonal and non–hormonal treatment among the groups by using software SPSS (version 16.0)

RESULTS AND DISCUSSIONS

Calculation of losses, response to different strategies in different treatment groups of anestrus buffaloes and the cost incurred has been presented in Table 2 and 3.

Economic Losses Due to Anestrus

The present study indicates that the approximate total economical loss per day per animal was found to be Rs. 372.90 (Table 2), if buffalo is not in production. The literature regarding such losses in buffaloes is meager. Pawshe et al. (2011) has reported an estimated loss from anestrus in cattle at around Rs.193.00 per day per cow. The above figure shows that economic losses are too high as incidence of anestrus in postpartum buffalo was reported to be very high i.e. 29.12 per cent (Kumar *et al*., 2013) in and around Jabalpur. Therefore, it needs proper attention and requires necessary actions in order to minimize economical loss.

Sr. No.	Particulars	Price in rupees Break up	Total
1.	Approximate total feed cost per animal/day		
	a) Concentrate – 5kg/day/animal (@ Rs. 14.28/Kg)	71.40	
	b) Dry fodder – 10kg/day/animal (@ Rs. 6.0/Kg)	60.00	
	c) Green fodder– 10kg/day/animal (@ Rs. 2.0/Kg)	20.00	151.40
2.	Cost of Veterinary health care/animal/day		
	a) Medicine	3.50	
	b) Physician cost	3.00	6.50
3.	Miscellaneous expenditure/day/animal		
	a) Cost of labour	18.00	
	b) Cost of electricity	3.00	
	c) Rent of housing or maintenances	4.00	25.00
	Total expenditure for rearing of per animal/day		182.90
4.	Loss through milk (If animal not in production)		
	(Production of milk: App. 5 lit./day @ Rs. 38.00/lit)		190.00
	Approximate total loss/animal/day		372.90

Table 2: Calculation of total economic loss in non productive buffalo

Estrus Induction and Cost of Treatment

The results indicated that estrus induction response of different treatment protocols did not differ significantly ($p<0.05$) among the groups, however, the finding indicated that higher proportion of animals exhibited estrus following hormonal treatments as compared to control (Gr. I). Maximum estrus induction response (76%) with the earliest onset (05.68±0.32days) was observed significantly ($p<0.01$) in group

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IV, after combined treatment of PMSG and insulin along with mineral mixture supplementation and deworming which might be due to synergistic effects of all the components. Rathour et al. (2005) and Prahalad et al. (2010) reported 83.33 and 90.00 per cent estrus induction in buffaloes using 1000 IU and 1500 IU PMSG, respectively. The literature regarding the use of PMSG in a dose rate 500 IU in true anestrus buffaloes is meager.

Table 3: Estrus induction and cost of treatment

Groups	Animals treated	Estrus induction		Mean treatment–estrus interval	Cost of treatment
	N	N	(%)	Mean	(Rs.)
G I	25	09	36.00	22.00±0.72[c]	61.00
G II	25	14	56.00	07.21±0.60[a]	346.00
G III	25	13	52.00	06.62±0.92[a]	258.50
G IV	25	19	76.00	05.68±0.32[a]	543.50
G V	25	17	68.00	09.82±0.69[b]	482.00
G VI	25	12	48.00	10.33±0.87[b]	285.00
G VII	25	12	48.00	07.67±0.92[a]	197.50

The result also indicated that the costs of treatment in different protocols of present study are different. The cost of treatment by using PMSG and Insulin along with mineral mixture supplementation and deworming is relatively higher (Rs.543.50) in comparison to other groups but the induction of estrus was observed greater in minimum period of time. As per the cost incurred, group I was found most economical but the mean treatment estrus interval was quite higher than the other groups. Therefore, it is recommended that different strategies may be used for the effective management of postpartum anestrus buffalo as per the need of situation.

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CONFLICT OF INTEREST
No conflict of interest.

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