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ECONOMIC IMPACT OF DOUBLE SYNCH PROTOCOL IN BUFFALOES DURING SUMMER SEASON

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Abstract: The aim of the study was to evaluate the economic impact of Doublesynch protocol by improving fertility in postpartum buffaloes. The experiment was conducted in 200 lactating buffaloes at dairy farm, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, Punjab during summer months (April to July). The buffaloes were divided into 2 groups. The buffaloes in group I (Doublesynch group, n=100) were administered PGF2α (Cloprostenol, 500 µg i.m.) on day -2, GnRH (Buserelin acetate, 20 µg, i.m.) on day 0, a second PGF2α on day 7 and a second GnRH on day 9 (Buserelin acetate, 10 µg, i.m.). The buffaloes were inseminated twice at 14 to 16 h and 38 to 40 h following second GnRH. Buffaloes in group II (Control group, n=100) that exhibited natural estrus during the study period were inseminated at detected estrus. Pregnancy diagnosis was performed at 45 days post AI by ultrasonography. The higher ($P<0.05$) pregnancy rate in Doublesynch (58.0%) compared to control group (39.0%) indicated the success of Doublesynch protocol in buffaloes during summer. The service period in Doublesynch group was 12 days shorter than in control group that improved the economics of dairy farm by Rs. 3225.12/pregnancy. In conclusion, profitability in dairy farming can be enhanced through application of Doublesynch protocol in postpartum buffaloes during summer season.
Keywords: Buffalo, Doublesynch, Estrus synchronization, Summer.

INTRODUCTION

Buffalo (*Bubalus bubalis*) is considered as mainstay of dairy industry in India as more than 50 % of the total milk production in the country depends on this single species. Buffalo is classified as shy breeder owing to lesser expression of estrus signs as well as duration of estrus phase compared to in cattle. The estrus intensity is further reduced during months of intense heat. The incidence of silent heat among buffaloes reaches its peak of 70 % in the hot summer month of April (Prakash *et al.* 2005). Failure to detect estrus, time of onset of estrus and time of insemination in summer stressed buffalo increases unproductive periods which adversely affect economics. It is anticipated that each animal losses 2 to 3 lactations due to poor reproductive efficiency, which largely change the economics of dairy farming (Beever

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2006). Synchronization of estrus is considered as major limitation in reproductive management of dairy buffalo. In cattle, a program termed Ovsynch was developed allowing timed artificial insemination without the need for detection of estrus (Pursley *et al.* 1995). Later, Ovsynch protocol was also applied in buffalo species (Ghuman et al. 2009). The use of Ovsynch protocol for fixed time artificial insemination during favorable season has been shown to give satisfactory results in buffalo (Baruselli *et al.* 2003), but it gives very low conception rate in summer stressed buffaloes (Karen and Darwish 2010). In cattle, Cirit *et al.* (2007) developed a new synchronization method "Doublesynch" that includes the administration of an additional PG injection 48 h before beginning the Ovsynch protocol. To our knowledge, there is no published report revealing benefit cost ratio of Doublesynch method of estrus synchronization in buffaloes. Thus, the aim of present study was to assess the economic impact of Doublesynch protocol in postpartum buffaloes during summer season.

MATERIALS AND METHODS

The study was conducted on 200 clinically healthy lactating buffaloes of Murrah and Nili Ravi breeds maintained at dairy farm, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, Punjab, India during the months of intense heat viz. April to July (Range of environmental temperature 30 – 46^0C). The buffaloes were kept in loose housing facilities, fed a total mixed ration, and milked twice a day. Buffaloes with reproductive abnormalities (i.e. metritis, pyometra, uterine-ovarian adhesions) were not included in the study. The buffaloes were divided into 2 groups. The buffaloes in group I (Doublesynch group, n=100) were administered PG (Cloprostenol, 500 µg i.m.) on day -2, GnRH (Buserelin acetate, 20 µg, i.m.) on day 0, a second PG on day 7 and a second GnRH on day 9 (Buserelin acetate, 10 µg, i.m.). The buffaloes were inseminated twice at 14 to 16 h and 38 to 40 h following second GnRH. Buffaloes in group II (Control group, n=100) that showed natural estrous during the respective study months were inseminated at detected estrus. Pregnancy diagnosis was established (by ultrasonography: Z5, Mindray) 45 days post A.I. Pregnancy rate was defined as the proportion of buffaloes assigned to respective group that became pregnant. The economic impact of Doublesynch protocol per pregnancy was worked out by collecting data from the dairy farm, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana. Fertility responses in both groups were evaluated using chi-square test.

RESULTS AND DISCUSSION

The economic impact of Doublesynch protocol per pregnancy is presented in table 1. On an average, each buffalo was fed around 35 kg green fodder, 2 kg dry fodder and 4.22 kg concentrate feed per day during the study period. Total daily cost of fodder and feed was worked out to Rs. 120.96 per buffalo by considering market sale price of green fodder, dry fodder and concentrate feed @ Rs. 1.00, 5.00 and 18.00/kg, respectively. The average milk sale rate was Rs. 34.66 per kg and wet average of the study population was 6.44 kg per day. Thus, daily income from sale of milk was Rs 222.80 per buffalo. A total of 25 labourers were engaged for management and handling of 200 buffaloes at the farm. Thus, labour charges per animal were calculated as Rs. 31.25 per day @ Rs. 250 per person per day. Total expenditure on hormonal injections (Doublesynch protocol) was Rs. 1275.00/buffalo. It was revealed that Doublesynch treatment increased pregnancy rates by 19 percentage units (58.0 vs. 39.0%, $P < 0.05$). These results confirm and support observations that the Doublesynch protocol increases the pregnancy rates in buffaloes as reported previously by Cirit *et al.* (2007) and Ozturk *et al.* (2010) in cattle, and Mirmahmoudi and Prakash (2012) in buffaloes. The service period in Doublesynch and control groups was 134 and 146 days, respectively. In other words, total 12 open days were saved in Doublesynch group that improved the economics of dairy farm by Rs. 3225.12 per pregnancy. Shah et al. (1991) also estimated the economic losses in Nili-Ravi buffaloes due to reproductive failure. Losses caused by sub-optimal calving intervals were Pakistani Rs. 9–14 per extra day per calving interval. It is believed that conception at a later stage of lactation in buffalo declines the financial returns by 24 to 27 per cent (Khan *et al.* 2008).

CONCLUSION

Buffalo exhibits poor estrus signs during months of intense heat viz. April to July. However, application of Doublesynch protocol may markedly improve the fertility in postpartum buffaloes during summer season. Moreover, timed AI following Doublesynch protocol seems to more economical compared to AI following natural overt estrus in buffaloes.

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Table 1: Economic impact of Doublesynch protocol in buffaloes during summer season

Sr. No.	Variable expenses/animal/day	Amount (Rs.)
1	Cost of fodder & feed	120.96
2	Labour charges	31.25
3	Milk losses	222.80
4	Total loss/open day (1+2+3)	375.01
Benefit Cost Analysis		
A	Overall losses (Total loss × 12*)	4500.12
B	Cost of medicines used in Doublesynch protocol/pregnancy	1275.00
C	Total savings in Doublesynch group (A – B)	3225.12

* Total days open saved in Doublesynch group (134 vs 146 d)