

APRW -43

Pregnancy Rates Following Timed Artificial Insemination in Estrumate[®]-Treated Sokoto Gudali Cattle

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Abstract

Pregnancy rates (PR) following timed artificial inseminations with frozen semen were investigated in 192 Sokoto Gudali (SG) cattle that were subjected to 11- and 12- day treatment intervals with prostaglandin F₂alpha (Estrumate[®]). Two point inseminations at 60 h and 72 h post Estrumate[®]treatments were used. All cattle were randomly allocated to 2 groups i.e. A and B, such that each sub-group of A1, A2, B1 and B2 had sixteen (16) cows and thirty two (32) heifers. Cattle in sub-groups A and B were administered Estrumate[®] at 11- and 12-day intervals, respectively. Cattle in sub-groups A1 and B1 were inseminated at 60 h while A2 and B2 were inseminated at 72 h, post second Estrumate[®] injection. Pregnancy was confirmed via rectal palpation. The results showed the following PR: 33%, 83%, 33% and 33% for cattle in sub-groups A1, A2, B1 and B2, respectively. It is concluded therefore that timed artificial insemination at 72 h in SG cattle treated with double Estrumate[®] injections at 11-day interval produced the best pregnancy rate. This information will be useful when planning breeding with Estrumate[®] and possibly other prostaglandins as synchronizing agent in Sokoto Gudali cattle.

Keywords: Timed artificial insemination, pregnancy rates, prostaglandin F₂ alpha, frozen semen, cattle.

Introduction

Timed Artificial Insemination (TAI) programmes describe estrus synchronization protocols wherein estrus detection prior to insemination is not necessary. The success of these programmes depend on the ability of the synchronization protocol/agent to achieve ovulation synchrony. Presently, some protocols e.g. OvSynch and CoSynch, involving two agents have been developed that perfectly fit into TAI. In OvSynch, Gonadotropin injections are administered on 0th and 9th days, separated by a Prostaglandin (PGF) on day 7 as was first described by Pursley *et al.*, (1995). The pregnancy rates in OvSynch (30-40%) are usually better, compared with less than 20% in cases where estrus was detected and followed by insemination (DeJarnette and Marshall, 2003). In the CoSynch, animals are handled only thrice, compared with four times in OvSynch and the pregnancy rate is only a bit lower compared with OvSynch (Pursley *et al.*, 1998). A PGF is involved in both protocols of TAI mentioned above, where it functions as a luteolytic agent (Graves *et al.*, 1985). An interesting fact is that PGF e.g. Estrumate[®] alone has been described as a single agent capable of synchronizing estrus. Its effectiveness, which has to do with the developmental status of the corpus luteum (CL)-determined by the stage of the estrous cycle in which the animals are at a given time, has been shown in caprine (Leigh *et al.*, 2010), bovine (Venkata *et al.*, 2013), ovine (Omotesi *et al.*, 2014) and swine (Alimi *et al.*, 2017). Two protocols are available with PGF as a single agent i.e. single and double injections 10-14 days apart, and depending on considerations of cost of hormone and labour involved, either options may be favoured. Some researchers have studied pregnancy rates (PR) resulting from timed insemination following PGF synchronization. A study reported 61.4%, 45.7% and 46.9% pregnancy rates to timed insemination at 72 and 96 hrs post single PGF treatment in zebu cows at three different farms (Rekwot *et al.*, 1999), while another (Voh Jr. *et al.*, 2000) reported pregnancy rates of 54.3%, 45.7%, 41.4% and 40.0% to timed insemination at 60, 72, 84 and 96 hrs post second PGF treatments, respectively. That pregnancy rate at 60 h was better than at later hours (Voh Jr. *et al.*, 2000) would alert inseminators that though peak estrus response occurs 2-3 days following PGF treatment, about 12 h to the end of that 'window' could be the optimum time for highest PR. Since PGF remains the most readily available synchronizing agent in the Nigerian market, and the Sokoto Gudali cattle occupies a critical position in socio-economic aspects in Nigeria, this study investigated pregnancy rates in Sokoto Gudali cattle subjected to two points timed artificial insemination at 60 h and 72 h following 11- and 12-day treatment intervals with Estrumate[®].

Results

The results are shown in Tables 1 and 2. Table 1 shows that under 11-day PGF synchronization interval, the pregnancy rates (PR) of 33% and 83% were obtained for Sokoto Gudali (SG) cattle inseminated at 60 h and 72 h post PGF injections, respectively. Table 2 similarly shows that under 12-day PGF synchronization interval, the PR of 33% was obtained for SG cattle inseminated both at 60 h and 72 h post PGF injections.

Table 1: Pregnancy rate of animals in group A treated with double PGF (Estrumate®) injections at 11 days interval.

Group (s)	No. Of Animals	Time of Insemination Post PGF Injection	Pregnancy Rate
A1	48	60 h	33%
A2	48	72 h	83%

Table 2: Pregnancy rate of animals in group B treated with double PGF (Estrumate®) injections at 12 days interval.

Group (s)	No. Of Animals	Time of Insemination Post PGF Injection	Pregnancy Rate
B1	48	60 h	33%
B2	48	72 h	33%

Discussion

Our results clearly indicate that a single-timed artificial insemination at 72 h following prostaglandin-PGF (Estrumate®) synchronization in a double injection protocol at 11 days interval gave the highest pregnancy rate (PR). In this study, the PR for Sokoto Gudali cattle in other groups i.e. 11-day PGF interval 60 h insemination, as well as 60 h and 72 h inseminations under 12-day PGF interval were quite low compared to that at 72 h, 11-day interval. It is not unlikely that the low PR in these sub-groups could have arisen from several other factors, not excluding poor synchronization rate. These results suggest that for SG cattle, best PR might be obtained with double injections of Estrumate® given at 11-day interval with insemination carried out at 72 h post Estrumate® injections. The present finding is not in total agreement with the report of a study conducted in northern Nigeria which found 60 h after two injections of PGF at 11 days interval as the optimum time for insemination in the White Fulani cattle (Voh Jr. *et al.*, 2000). The position of these authors cannot be contested at this level but it will suffice to reiterate that the present study recorded only 33% PR under conditions that the earlier report claimed was best. The present study also shows that insemination around the end of the window for peak estrus response following PGF (Estrumate®) treatment, and not 12 h earlier, yielded highest PR. In a similar study, Voh Jr. (1996) reported a PR of 74.1% in control cattle that were inseminated 12 h after detected estrus. Our current finding of 83% PR is undoubtedly better than 74.1%, suggesting an advantage in terms of efficiency of PGF synchronization over detected/spontaneous estrus. The current findings also appeared to be in consonance, though with a caveat, with the report that in heifers, single insemination at 72 h or 80 h after treatment with PGF gave normal fertility compared with insemination at 48 h or 60 h (Roch, 1977). Our finding with PR at 72 h insemination in the 11-day treatment interval group is in line with this report, albeit, cattle in group B2 had low PR. This observation may further strengthen the importance of PGF treatment interval in cattle synchronization programmes in that a day difference in synchronization interval may result in huge losses with regards to PR as shown in this study. The present finding of 83% PR is also suggestive of an improvement over two-fixed time inseminations at 60 h and 72 h following a single administration of PGF in which the highest PR obtained in three farms was 61.4% (Rekwot *et al.*, 1999).

Conclusion

We conclude that timed artificial insemination at 72 h following double prostaglandin (Estrumate®) injections at 11-day treatment interval produced the highest pregnancy rate in Sokoto Gudali cattle.

Recommendation

We recommend that Sokoto Gudali cattle treated with double prostaglandin (Estrumate®) injections at 11-day interval should be inseminated at 72 h later for high pregnancy rate.

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