

Evaluation of Estrous Synchronization and Mass Artificial Insemination Service of Dairy Cattle in East Wollega Selected Districts, Western Ethiopia

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Abstract: The objectives of this study were to assess the hormonal response, conception rate, calving rate and perception of farmers towards the technology. The study was conducted in five (5) districts namely GutoGida, WayuTuka, Sibbu Sire, Gobusayo and Diga of East Wollega Zone from October 2013 to December 2015 for three years. From 22415 cows and heifers brought by farmers for the services, 66.99% (15016) that fulfilled the selection criteria were selected and injected with 2 ml of Estrumate. Data on the history of each heifers and cows, number of heifers and cows responsive to hormonal treatment, conception and calving rates were collected. The collected data were analyzed using descriptive statistics. The results of the finding showed that 11353 (75.6%) of cows and heifers were responsive to hormonal treatment. Majority 11333 (99.82%) of responding cows and heifers were inseminated. Finally, 1211(10.67%) of calves were delivered. Estrous response rate was relatively high, but conception rates and calving rates were very low. The lower percentages of conception rate which was observed in this study were associated with problems like selection of heifers and cattle, timing of insemination, heat detection problem of farmers, Semen quality and motility, distance from artificial insemination (AI) service centers and poor husbandry practice of heifers and cows. To improve the effectiveness of the technology, there is a great need of skilled and experienced technician and capacity building of farmers in heat detection and husbandry practices. Improvements in facilities and management should be necessary before implementing effective estrous synchronization and mass artificial insemination program.

Key words: Estrumate • Cow/Heifer • Artificial Insemination • Oestrus Synchronization

INTRODUCTIONS

The history of estrous cycle synchronization and the use of artificial insemination (AI) in cattle is a testament to how discoveries in basic science can be applied to advance the techniques used for livestock breeding and management. The tools to control the timing of the onset of estrus is by controlling the length of the estrous cycle and choices of approaches for controlling cycle length are: to regress the corpus luteum (CL) of the animal before the time of natural luteolysis and thereby shorten the cycle or to administer exogenous progesterin's to delay the time of estrus following natural or induced luteolysis which may extend the length of the estrous cycle. In either case, the emphasis is placed upon controlling or mimicking luteal function to control the time of estrus [1].

Variations on one of the two approaches to cycle control are the basis for commercially-available products which successfully synchronize estrus in the majority of cows or heifers within a 5 to 7 day period and which yield

conception rates following heat detection and AI breeding that are similar to those following AI after a spontaneous estrus. Concurrent with the last few years of research on controlling estrous cycle length has been the development of a better understanding of follicular development. Methods of interrupting or manipulating the wave-like pattern of follicular growth and controlling ovulation have been developed [2].

Livestock systems in developing countries are characterized by rapid change [3] and currently contributes about 30% of agricultural gross domestic product, with a projected increase to about 40% by Food and Agriculture Organization [4].

Objectives of the Study

The General Objectives: Was to investigate the major factors affecting the efficiency of oestrus synchronizations done using single injection of Prostaglandin PGF 2α and AI at East Wollega Zone selected Districts. Whereas the specific Objectives were

to assess the hormonal response in Oestrus synchronizations, to assess conception rate, to assess calving rate and to assess perception of farmers towards the Oestrus synchronizations

MATERIALS AND METHODS

Description of the Study Area: The study was conducted in five districts namely GutoGida, WayuTuka, Sibuu Sire, BonayaBoshe, Gobusayo and Diga districts of East Wollega Zone western part of Ethiopia. It is located at 328 km west of Addis Ababa the capital of Ethiopia. Regarding the agro-Ecology of the zone, out of the total land size 41.74% is low land, 51.08% midland and 7.18% highland. The annual mean temperature ranges between 10 and 36°C and the annual mean rain fall ranges from 800-2260mm. The Districts were selected by Agricultural Growth Program Supported and sponsored districts and Milk shed districts of East Wollega Zone. Out of 22415 cows and heifers brought to the Fifteen sites, only 15016 (66.99%) (2267 from GutoGida, 2992 from WayuTuka, 2590 from Sibuu Sire, 2316 from GobuSayo and 4851 from Diga) were selected. Among selected cows and heifers, 14835 (98.97%) were Zebu and 181 (1.09%) were Cross breed. The average body weight of cow s/heifer was 250 kg (range from 180 to 320). The average age of cows and heifer was 5.5 years range from 4 to 7 years.

The females which were diagnosed to be cycling with presence of a functional CL was determined through rectal palpation by AI technician were injected (2 ml) PGF2α (SynchroMate, Bremer Pharma GMBH, Germany, 1 ml solution of SynchroMate contains Estrumate 0.263 mg equal to Estrumate 0.250 mg) intramuscular. The protocol used for the experiment was one single injection, heat detection and artificial insemination.

Data Collection: The study was conducted from October 2013 to December 2015. Data on age of the cow and heifers, breed, body weight, date and time of hormone treatment, date and time of oestrus detection, date and time of artificial insemination, conception rate (pregnancy diagnosis was carried out at three months of post artificial insemination by rectal palpation) and delivery rate were recorded. Group discussion was also conducted at each site to assess the perception of farmers towards the technology.

Data Analysis: The data were entered in Microsoft Excel 2010, checked and analyzed by descriptive statistics using SPSS computer software program (version 20). Estrus rate (Number of cow showed oestrus/ Number of cows treated multiplied by 100) and conception rate (No. of cows/heifers pregnant / No. of cow s/heifers inseminated multiplied by 100) were also calculated.

RESULTS

Hormonal Response and Insemination Rate: The result of the finding showed that 11353(75.60%) of cows and heifers were responsive to hormonal treatment. Out of 11333(99.82%) of the inseminated responded cows and heifers, 20 (0.17%) of cows were aborted due to the drug effect as animal were at early stage of pregnancy and the remaining cows/heifer which did not show heat signs were not inseminated as presented in Table 1.

Conception and Calving Rate: The conception rate of 34.61% (3929) was obtained, after three months pregnancy diagnosis. Finally, the calving rate was 10.67% (1211). A total of 541 females and 683 males were delivered finally in (Table 1).

Table 1: Number of cows selected for hormonal treatment and AI after heat sign of cows in East Wollega zone

Woreda	Guutoo Giddaa	Waayyuu Tuqaa	Sibuu Siree	Gayyoo Sayyoo	Diggaa	Total
Animals total	3010	4265	4264	3411	7465	22415
Selected	2842	3346	3274	2692	6103	18257
Non treated%	75.3156	70.1524	60.7411	67.898	64.9833	66.9909
Hormonally treated	2267	2992	2590	2316	4851	15016
Inseminated	1711	2027	1954	2036	3625	11353
Pregnancy diagnosis total	1024	1281	1081	2229	2670	8285
Pregnant	501	571	533	727	1597	3929
Non-pregnant	523	710	548	1502	1073	4356
Responded %	75.474	67.747	75.444	87.91	74.727	75.606
Conception %	29.28	28.17	27.28	35.71	44.06	34.61
Aborted	3	1	2	3	11	20
Born calves male	165	56	66	120	276	683
Female	122	56	49	101	213	541
Total calves	284	102	115	221	489	1211
Birth percent	16.6	5.03	5.89	10.85	13.49	10.67
Causes of on non-selected animals						
Pregnant	204	278	251	223	574	1530
Reproductive disorders	247	553	960	716	1362	3838
Uterine problem	213	209	245	34	229	930
Total	664	1940	1456	973	2165	6298

Perceptions of the Farmers Towards the Technology:

After group discussion with farmers in each site, they had interest to get the services to have improved breed. Cows and heifers were travelled 2-7km to get the service. In each study area, only two AI technicians were serving large population of cattle and there were no effective regular AI service. Farmers, in the area, were not aware of hormonal estrous synchronization protocols and AI technology, which contributed in the poor efficiency of the services. Lack of awareness of associated with some farmers during group discussion were immediately mix cows and heifers with other herds after hormonal injection, long distance trucking of cows and heifers, cows and heifers were not brought at the right time for insemination and poor management practices. In general, farmers' perceptions with hormonal estrous synchronization technology were variable and the satisfaction of them determined by calving rates. Therefore, those farmers that got calf develop positive perception towards the technology and satisfied than others.

DISCUSSION

As compared with the current finding, using single injection of prostaglandin F₂ α (Lutalyse) protocol different response rate was reported in different part of the country, higher estrous responses rate were reported [6], where the response was 97.7% in Hawassa-Dale milk shade and 100% in Adigrat-Mekelle milk shade areas. Adebabay *et al.* [7] reported an estrous rate of 89.3% in Bahir Dar milk shed. The estrous rates were; 72.3 and 92.17% in West Shoa zone and Wukro Kiltawulaelo district of Northern Ethiopia [8]. Moreover, using the same protocol of the current study, 84.2% estrous rate was reported in eastern zone, of Tigray region, Ethiopia [9].

The conception rate obtained in this study was higher in comparison to 13.7% reported for [7] Bahir Dar milk shed area [7] and 13.58% reported Mizan Aman area Bench Maji zone South West Ethiopia [10]. The, pregnancy rate of the current study was low compared to that reported (57.7%) for Hawassa-Dale milk shade and (61.7%) Adigrat- Mekelle milk shade [6]; and (59.6%) for eastern zone of Tigray region, Ethiopia [9], but slightly higher that (32.17%) reported for Wukro Kiltawulaelo district [11].

Factors associated with this lower rate of pregnancy might be related with timing of artificial insemination, feeding management, efficiency of heat detection, early embryonic mortality and presence of ovarian cyst which are all known to negatively affect fertility. Factors affecting embryonic/fetal loss are numerous and include genetic abnormalities, fescue toxicosis, plant toxins,

excess protein, heat stress, reproductive diseases, an effect of the sire and handling or transportation stress [12].

The result of this study is slightly similar with calving rate 13.58% reported [10] Bench Maji zone, South West Ethiopia.

CONCLUSIONS

As this study indicates, using single injection of PGF₂ α in fully extensive system of management was ineffective to synchronize cows and heifers. Estrous response rate was relatively high, but conception rates and delivery rates were very low. To improve effectiveness, skilled and experienced technicians as well as capacity building of farmers in heat detection and husbandry practices are of major concerns.

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