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Title of thesis : Studies on the effect of fixed time insemination on conception following oestrus synchronization in cattle

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SUMMARY

The work was conducted in university dairy farm of CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur. A total of 111 cows (51 cyclic and 60 anoestrus) were selected for the study.

Among cyclic animals (Groups I, II, III and IV), 12 Jersey and 19 Jersey x Red Sindhi crossbred cows were selected on the basis of their exhibition of regular estrus signs. Presence of C.L. on any ovary was confirmed on day of start of trial. In group I and II, 6 Jersey and 10 crossbred cyclic cows, respectively, were injected with Prostaglandin F$_2$ alpha (Iliren) intramuscularly on day 0 of trial. In group III and IV in 6 Jersey and 9 crossbred cyclic cows, Norgestmet ear implant (Crestar) was inserted subcutaneously at the base of ear. Crestar injectable solution was injected intramuscularly along with implant insertion. Implant remained in situ upto 9 days and was removed on day 10 of trial. Prostaglandin F$_2$ alpha was administered intramuscularly, on 10th day of trial immediately before implant removal.

In anoestrus animals (Groups VII, VIII, IX and X), 20 each Jersey and Jersey x Red Sindhi crossbred anoestrus cows were further divided into true anoestrus or silent estrus. In groups VII and VIII, 10 Jersey and 10 crossbred silent estrus cows, respectively, were injected with Prostaglandin F$_2$ alpha intramuscularly on 0 day of trial. In groups IX and X in 10 Jersey and 10 Jersey x Red Sindhi crossbred true anoestrus cows, Norgestmet ear implant was used subcutaneously at the base of ear. Crestar injectable solution was injected intramuscularly along with implant insertion.

Forty cows (group V = 10 Jersey cyclic, group VI = 10 crossbred cyclic, group XI = 10 Jersey anoestrus and group XII = 10 crossbred anoestrus) did not receive any treatment and served as untreated control groups. Anoestrus cows remained in observation for 42 days from day of their selection.

In all treatment groups, three fixed time AI were done with frozen thawed semen of respective bull breeds on 2nd, 3rd and 4th days of trial (48, 72 and 96 hours of implant removal and/or Iliren injection), respectively. Cyclic control animals received artificial inseminations twice at 24 hr interval when they exhibited natural estrus. All the signs of
estrus were noted on days of AI in all the groups. Cows failing to conceive and repeating following synchronized or induced estrus were inseminated again to know the fertility in subsequent estrus. Pregnancy diagnosis was done by per-rectal examination 60 days post AI in all the animals not repeating. Cows neither conceiving to induced estrus nor exhibiting subsequent estrus were classified as anoestrus.

Following the use of Norgestomet and Prostaglandin F$_2$ alpha combination for synchronization of estrus in cyclic cows, all the cows, irrespective of breed, were in estrus at 48, 72 and 96 hr after implant removal. None of cows showed mounting at 72 and 96 hr post implant removal in both breeds. Number of Jersey cows with good uterine tone decreased at 72 hr but was then maintained at 96 hr but in crossbred cows the number increased marginally at 72 hr and decreased at 96 hr post implant removal. In all Jersey as well as crossbred cows, cervix was open at 48 hr and remained open at 72 and 96 hr post implant removal. Following insemination of these animals, 16.67 percent Jersey animal conceived at synchronized estrus. In subsequent estrus, 50 percent repeated cows conceived. The overall CR after 2 inseminations (synchronized + subsequent first estrus) was 33.33 percent. However, 50 percent cows again went into the anoestrus stage post synchronization and did not repeat during the period of this study. Better results were recorded in crossbred cows, where 44.44 percent animals conceived at synchronized estrus. At subsequent estrus 66.67 percent cows conceived. Overall conception was 66.67 percent. But 22.22 percent cows did not come into subsequent estrus following synchronization. Irrespective of the breed 33.33 percent animals conceived at synchronized estrus. In subsequent estrus 60 percent of them conceived with an overall conception of 53.33 percent and 33.33 percent cows went into the state of anoestrus subsequent to synchronization.

Following the use of Norgestomet implants in anoestrus animals, as in cyclic synchronized cows, all the animals, irrespective of breed, were in estrus at 48, 72 and 96 hr after implant removal. Number of Jersey cows showing mounting behavior decreased at 72 hr and was not exhibited by any cow at 96 hr. Crossbred cows maintained it upto 72 hr and at 96 hr post implant removal no cow was showing this symptom. Similarly, number of Jersey animals showing vaginal discharge also decreased gradually at 72 and 96 hr but crossbred cows maintained it at 72 hr though decreased at 96 hr post implant removal. Similarly, cows of both categories showed good uterine tone upto 72 hr but it decreased at 96 hr. Cervix remained open in all the cows till 96 hr post implant removal. Following insemination of Jersey anoestrus cows induced in estrus and inseminated, 20 percent animals conceived. In subsequent estrus 50 percent of the cows conceived. The overall CR after 2 inseminations (induced + subsequent first estrus) was 30 percent and 60 cows again went into the state of
anoestrus. Similarly, among crossbred anoestrus cows induced in estrus and inseminated, 40 percent animals conceived. All the cows repeated at subsequent estrus conceived. Overall conception was 70 percent and 30 percent cows did not come into subsequent estrus following induction.

Irrespective of breed, 30 percent cows conceived at induced estrus and among the repeated cows at subsequent estrus 80 percent of them conceived with an overall CR of 50 percent following AI in the induced and subsequent first estrus and 45 percent cows again went into the state of anoestrus subsequent to induction. Following Prostaglandin F$_2\alpha$ alpha administration, for synchronization of estrus in cyclic animals, none of Jersey cows showed mounting behaviour. Whereas, 30 percent crossbred cows showed mounting that decreased gradually at 72 and 96 hr post implant removal. Number of Jersey cows showing vaginal discharge at 48 hr, remained same at 72 hr and decreased at 96 hr. Number of crossbred cows showing vaginal discharge increased at 72 hr but decreased at 96 hr post injection. In both categories of cows number with good uterine tone remained same up to 72 hr but decreased at 96 hr post implant removal. However, cervix of all cows remained open up to 96. It is apparent from these observations that, as in previous group, though many of the cows did not exhibit external manifestation, all animals were in estrus at 48, 72 and 96 hr after PG administration and estrus was synchronized.

Following the insemination of Jersey cows synchronized in estrus and inseminated, 16.67 percent animal conceived. Among the animals repeated at subsequent estrus 33.33 percent conceived. The overall CR after 2 inseminations (synchronized + subsequent first estrus) was 33.33 percent and 33.33 percent cows went into the state of anoestrus subsequent to synchronization. Better results were recorded in crossbred cows. Among the crossbred cows synchronized in estrus and inseminated, 40 percent animals conceived. However, among the cows repeated at subsequent none conceived. Overall conception was 40 percent and 40 percent cows did not come into subsequent estrus following synchronization. Overall, irrespective of the breed, 31.25 percent cows conceived at synchronized estrus. At subsequent estrus the conception was 20 percent with an overall CR of 37.5 percent cows conceiving following the synchronization and subsequent first estrus and 43.75 percent animals again went into the state of anoestrus subsequent to synchronization.

Following Prostaglandin F$_2\alpha$ alpha administration, for induction of estrus in Jersey and crossbred anoestrus cows, all the cows, irrespective of breed, were in estrus 48, 72 and 96 hr after injection. Number of Jersey cows showing mounting behavior decreased gradually at 72 and 96 hr but none crossbred cows showed it at 48 and 72 hr though one crossbred cow exhibited mounting at 96 hr. Similarly, number of Jersey animal showing vaginal discharge
also decreased gradually at 72 and 96 hr post PG administration but in crossbred cows it
decomposed at 72 hr and then maintained at 96 hr post injection. Percentage of Jersey cows
exhibited good uterine tone increased at 72 hr but then decreased at 96 hr post PG
administration. In crossbred cows percentage of cows with good uterine tone was maintained
upto 72 hr but decreased 96 hr post Prostaglandin F$_2$ alpha administration. However, cervix of
all cows of both breeds remained open up to 96 hr. Though many of the cows did not exhibit
external signs, estrus was induced in all anoestrous cows and all animals were in estrus at 48,
72 and 96 hr after Prostaglandin F$_2$ alpha injection. Following the insemination of anoestrous
Jersey cows induced in estrus and inseminated, 30 percent cows conceived; the CR in
animals repeated at subsequent estrus was 33.33 percent. The overall CR after 2
inseminations (induced + subsequent first estrus) was 40 percent and 40 percent non-
pregnant cows again went into the anoestrus. Similarly, among the crossbred anoestrous cows
induced in estrus and inseminated, 20 percent animals conceived. Among the animals
repeated at subsequent estrus 40 percent conceived. Overall conception was 40 percent and
30 percent cows did not come into subsequent estrus following induction.

Overall, irrespective of the breed, 25 percent cows conceived at induced estrus. and
37.5 percent conceived at subsequent estrus with an overall CR of 40 percent following AI in
the induced and subsequent first estrus and 35 percent animals again went into the state of
anoestrus subsequent to induction of estrus with Prostaglandin F$_2$ alpha injection.

Conclusions drawn from this study are;
1. Norgestomet implants in combination with PGF$_2$α or PGF$_2$ α alone are sufficient to
synchronize estrus in Jersey and crossbred cyclic cows. However, many cows do not
exhibit external signs of estrus. Therefore, inseminators should follow fixed time AI
schedule.
2. Norgestomet implants can induce estrus in all Jersey and crossbred true anoestrous cows.
PGF$_2$α is also an effective treatment in silent estrus cows. But many treated anoestrous
animals do not exhibit external signs of estrus.
3. Although, the norgestomet implants as well as PGF$_2$α are a highly effective option for the
induction of estrus in acyclic cows and synchronization of estrus in cyclic cows, these
preparations are not very effective as regards CR in the induced estrus is concerned,
however, a good number of animals show subsequent natural cycles. These subsequent
estruses are fertile and a good number of cows can conceive.
4. Cyclic animals synchronizated with Norgestomet + PGF$_2$α combination give better
conception compared to PGF$_2$ α alone. Similarly, Norgestomet implants are beneficial
compared to PGF$_2$α in obtaining optimum conception in anoestrus animals also.