SYNCHRONIZATION OF ESTRUS:

Synchronization means to time the events together. In animal breeding, Synchronization has major role to play especially to bring the animals to estrus (heat) at a desired time by using exogenous hormones.

BENEFITS OF SYNCHRONIZATION

Estrous synchronization has many benefits some of which are:

- Enables a compact mating and calving period. This enables farmers to time the period of calving to the optimum time of the year or when sufficient feed is available.

- Less labour. By synchronizing a large number of cows or heifers to the same time period allows an inseminator to join all cows in a district to one or two periods in a year rather than him having to inseminate individual cows.

- Synchronization of estrus enables calving to coincide with nutritional availability. A compact calving period can thus increase the period of lactation in a cow and thereby increased production.

- A compact calving period enables cows to regain condition before the next mating. This means that fewer cows will be "culled" as empties.

- Synchronizing cows in a district means that greater genetic gain will occur. This is based on the fact that A.I usually employs sires of greater genetic merit than is present in the cattle population and as synchronization enables more cows to be mated to the elite bulls, greater genetic gain will occur.

Synchronizing Agents:

Over the past number of years a number of substances have been introduced to induce estrus in farm animals. These basically fall into two distinct groups

I. PROGESTERONE:

This consists of:

PRIDS (progesterone releasing intra-vaginal device-a siliconized coil containing progesterone)

CIDR-B (controlled intra-vaginal delivery release - bovine a silicone elastomer impregnated with natural progesterone).

Synchromate - B (a norgestimate subcutaneous implant).

II. PROSTAGLANDIN, which is composed of:

DINOFERTIN (pure prostaglandin)

ESTRUMATE (Analogue)

FENPROSTALENE

LUPROSTIOL
PROGESTERONE:
*Oral progesterone:*

Several progesterone has been subjected to intensive field trials but with poor results. In order to improve the Effectiveness of the progesterone's they have been incorporated into intra-vaginal implants. When these were administered alone subsequent estrus periods were insufficiently synchronized and in order to improve the efficiency of the progesterone implants it was found that an estrogen was required. With the discovery that synchronization was able to be tightened by the inclusion of estradiol a number of preparations subsequently came in to the market. Some were to be inserted into the vagina whereas others were to be given as subcutaneous implants. When the progesterone was given as subcutaneous implant, the estradiol was required to be administered as a injection at the time of implants insertion. If the progesterone was to be given as an inter-vaginal device, the estradiol was administered either as a capsule inserted into the inter-vaginal device or as an intramuscular injection. Of the inter-vaginal devices, two became widely used, the PRID, which is a stainless steel, spiral with a silicone impregnated with progesterone. As the progesterone from this device was released slowly, a progesterone injection at the time of insertion was also required. This was then combined with the Estradiol. Due to the fact that an injection was required and because these devices were thought to cause some vaginal irritation, they soon lost favour. These were subsequently replaced by CIDR-B or controlled inter-vaginal delivery release-Bovine

**CIDR-B.**
(Distributed by RAB Australia, P.O. Box, Albury) Presentation in boxes of 10 with 10 estradiol capsules).

This is also an inter-vaginal device however the progesterone is impregnated into a silicone elastomer molded over a T-shaped nylon spine which is used to retain the devise in the animal. The progesterone from this device is found to be released at a constant rate thereby maintaining blood levels of progesterone in the animals. Once the CIDR-B is removed, blood levels fall precipitously. This allows follicle maturation, behavioural estrus and ovulation, as in the normal breeding cycle. Either an estradiol capsule is inserted into the device, or an injection of prostaglandin is given on the withdrawal of the CIDR-B. These two drugs were found to significantly tighten the synchrony. Conception rates in the order of 75% have been achieved with fixed time inseminations after the use of the CIDR-B device.

The CIDR-B can also be used to re-synchronize cows and heifers, which fail to conceive after the first insemination. In animals that have been inseminated, a CIDR-B is inserted on day 16th following insemination. The device is then removed 5 days later.

Non-pregnant- animals will show sign of estrus after 48 to 96 hours after the
withdrawal of the CIDR-B. The progesterone of the CIDR-B does not disrupt pregnancy in animals that have conceived during the first insemination. As the CIDR-B contains sufficient progesterone for 22 days, reuse of device is possible.

Since CIDR-B are being placed in the vagina for an extended period of time, it is important that care is taken to avoid transport into the vagina of foreign material on application.

HOW TO USE:

**Program A: CIDR-B + Estradiol capsule:**

Day 0 - Insert CIDR-B Estradiol capsule
Day 12 - Remove CIDR-B
Day 14-15 - Inseminate related to heat detection.

**Program B: CIDR-B + Prostaglandin**

Day 0 - Insert CIDR-B
Day 12 - Remove CIDR-B and give 1/2 dose of Prostaglandin

Inseminate 48-72 hours after the removal of CIDR-B.

All cows should be categorized into one of the three breeds:

1. High grade Jersey
2. High grade Siri
3. Hybrid
   - Cows should be rectally palpated to ascertain ovarian status and classified as
   - Active with C.L
   - Active with follicles
   - Inactive
   - Possibly cystic
   - Determine whether the cow is wet or dry (lactating or dry)
   - Body score all animals used in the trial
   - Obtain data on the age of the cow
   - Insert CIDR-B and record date and time of insertion.
   - Advise farmer not to pull the CIDR-B inserted.
   - If CIDR-B is dislodged then the date when this occurred should be recorded by the farmer
   - Insert for a period of 12 days and record the date of removal
   - Record when animals are in heat
   - Inseminate 12 hours after standing heat

PROCEDURE FOR THE COLLECTION OF DATA IN A CIDR-B TRIAL:

- Select a region where there are 60-80 animals to be used in the trial
- All cows to be used in the trial should be at least 2 month postpartum

Prepare by Tshewang Dorji
• After 45 days determine conception rate.

SYNCHROMATE B:
(Itervet product)
Presentation Box of 25 doses.

This consists of estradiol valerate with norgestimate and an implant containing just norgestimate. Norgestimate is very potent synthetic progesterone with a potency factor of 100 to 200 of progesterone. The injection is administered intramuscularly and at the same time the implant is inserted into the outer aspect of the ear. The ear insert is removed after 8 to 10 days. The implant contains 3 mg of norgestimate. The 2 cc injectable solution contains 3 mg of norgestimate and 5 mg estradiol valerate.

The principal of action is that the norgestimate inhabits any pituitary activity. The injection of norgestimate affects the Hypothalamus inhibiting any further release of FSH or L.H. The estradiol valerate also in the injection prevents any further CL development and causes regression of the Corpus Luteum in animals, which have recently ovulated. As synchromate B releases norgestimate from the insert, the animal has an artificial gland releasing progesterone and therefore creates a false CL.

On removal of the Synchromate-B the artificial CL is removed and cyclicity can resume. Insemination should be performed 48 to 56 hours after device removal.

PROSTAGLANDIN:

Prostaglandin F2 alpha is a natural luteolytic hormone in the cow. As the natural prostaglandin is rapidly degraded in the body, a number of synthetic products have been formed that enables smaller doses of prostaglandin to be administered while maintaining the luteolytic activity. Luteolysis can be induced in the cow with a dose of 25 mg of PG F2 alpha (Dinofertin) the natural Prostaglandin or 0.5 mg of its synthetic analog Estrumate (clorprostelinol). The prostaglandin’s are administered via inter muscular injection and are only effective in inducing estrus when given between day 4 and 18 of a normal cycle. During the first 4 days of cycle the corpus luteum is not operational and during the last 4 days of the cycle, the CL is regressing.

If all the animals treated during the initial course, they are administered a second injection of PG F2 alpha 11 days later, they then all theoretically be responsive to the second injection of the prostaglandin. The effectiveness of the prostaglandins also relies on the fact that there is a corpus luteum present. If the CL is not present then the animal will not respond.

HOW TO USE:

PG F2 alpha

- After 11 days

PG F2 alpha
- Inseminate after heat displayed or inseminate at 72-84 hours after 2nd injection or double insemination once at 72 hours and 2nd insemination at 96 hours.