Estrus Synchronization in Domestic Animals

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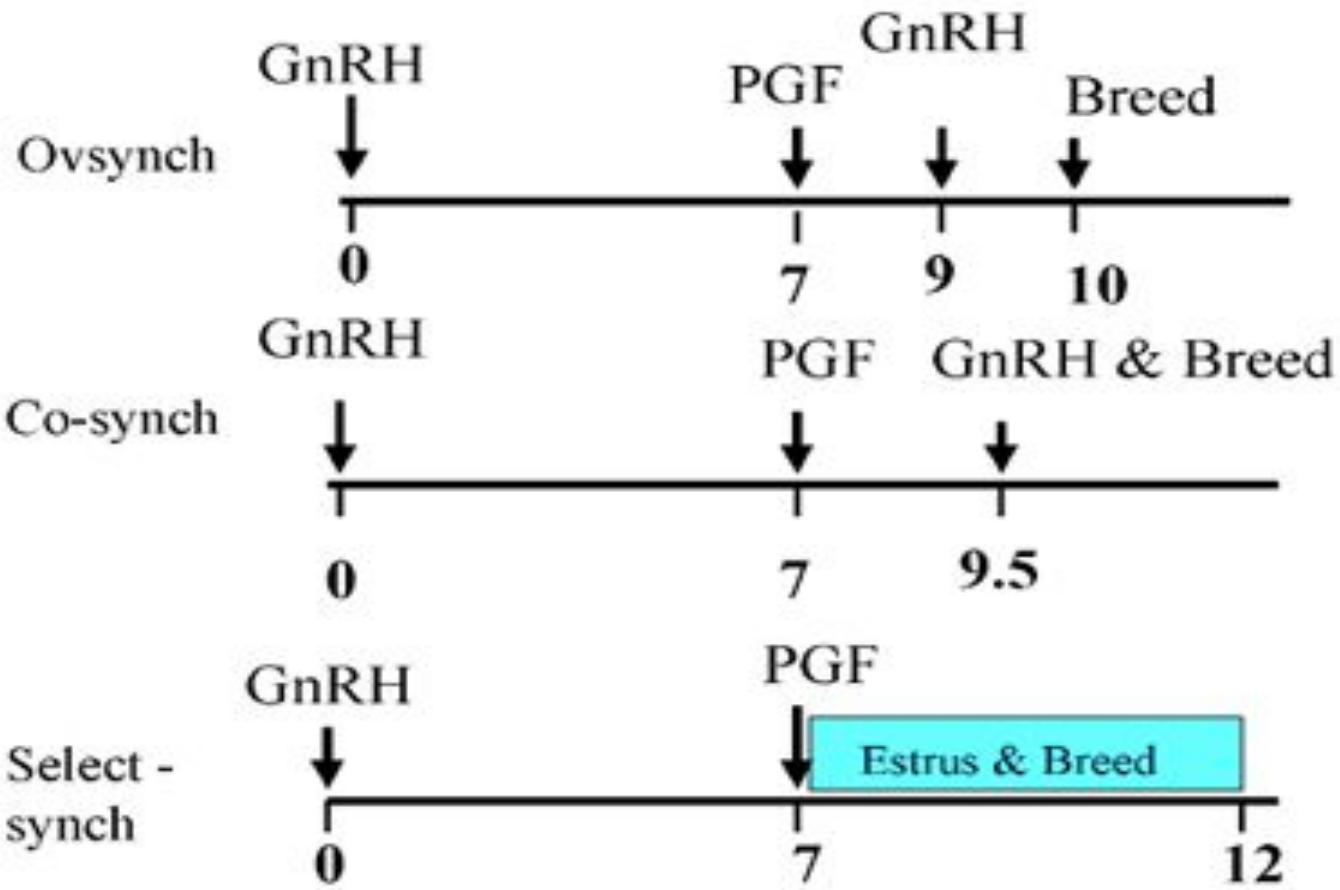
Background

- Animals needs to be bred in time for farm profitability and sustainability.
- Estrus events scattered randomly during the time period.
- Arranging artificial insemination frequently puts a burden on the farm resources.
- Failure to breed an estrous cow results in economic loss to the farm.
- Estrus occurs at known intervals at 21-days intervals and small/non-commercial farmers inseminare their animals at am-pm rule.
- At commercial/medium or large farms breeding needs to be synchronized with the occurrence of estrus to prevent management/financial burden on the farm; in dairy as well as beef animals.
- The is called synchronization of estrus, bringing animals into standing estrus around the same time.
- Estrus synchronization is usually accompanied with timed artificial insemination.

Principles

- Estrous cycle continues constantly after the onset of puberty in the female animals, enabling female to conceive, repeating at 21 days interval in cattle and (Qureshi 2011).
- Estrous cycle comprises a luteal (LH) and a follicular (FSH) phase controlled by GnRH.
- Animals not bred or failing to conceive repeats to estrus on 21st day of the previous estrus due to termination of corpus luteum, ending the luteal phase.
- Estrus synchronization manipulates the length of the estrous cycle as a management tool of breeding practices.
- Estrous synchronization comprises:
  - Maintain luteal phase through progestogens (injections, IV sponges/CIDR/SC implants
  - Improve the luteal profiles/conception rate in buffalo heifers with melatonin
  - Interrupt diestrus through exogenous prostaglandin injection
  - Improve follicular development and estrus induction through GnRH and estrogens

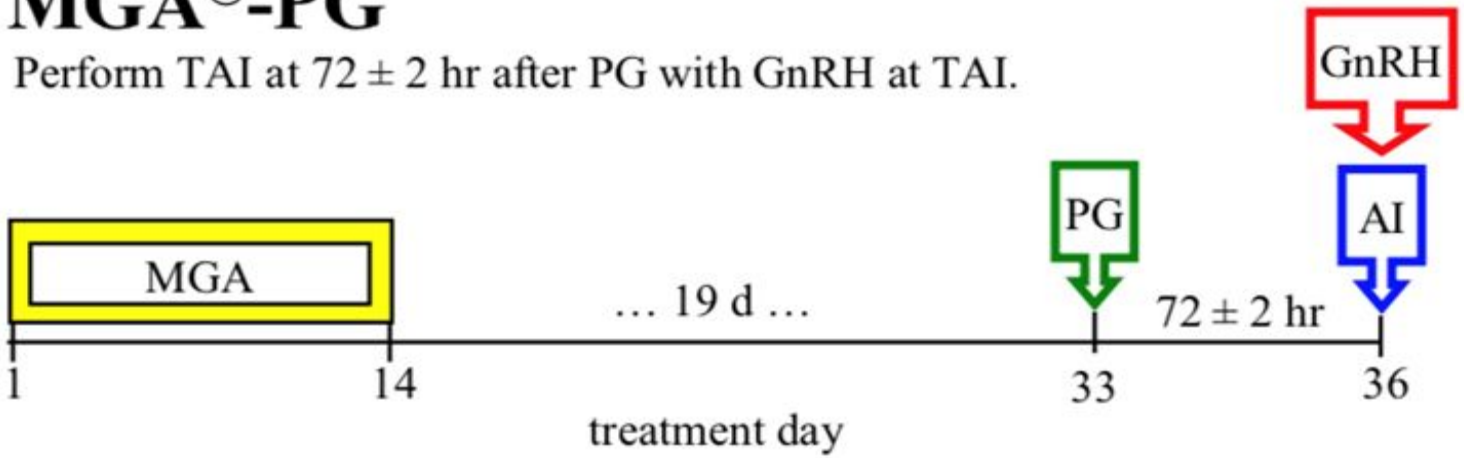
- No Heat Detection
- Limited Heat Detection
- Extensive Heat Detection



Virginia Coop Extension - Virginia Tech Univ USA, 2000

MGA®-PG

Perform TAI at 72 ± 2 hr after PG with GnRH at TAI.



- Melengestrol acetate (MGA) is an orally active progestin.
- When fed at a rate of 0.5 mg/d per heifer, estrus is suppressed and ovulation is prevented.
- Prostaglandin F2 (PG), a luteolytic compound, administered on d 6-16 of the estrous cycle.
- Premature regression of the corpus luteum (CL) will occur and the heifer will return to estrus.
- Heifers are offered MGA in their diet for 14 d, followed by a PG injection 19 d later.
- Heifers are inseminated 72 ± 2 h following PG.
- An injection of gonadotropin releasing hormone (GnRH) should be given at AI.
- Release of luteinizing hormone (LH), causing ovulation of a dominant follicle.

(UNL Beef, University of Nebraska, USA)

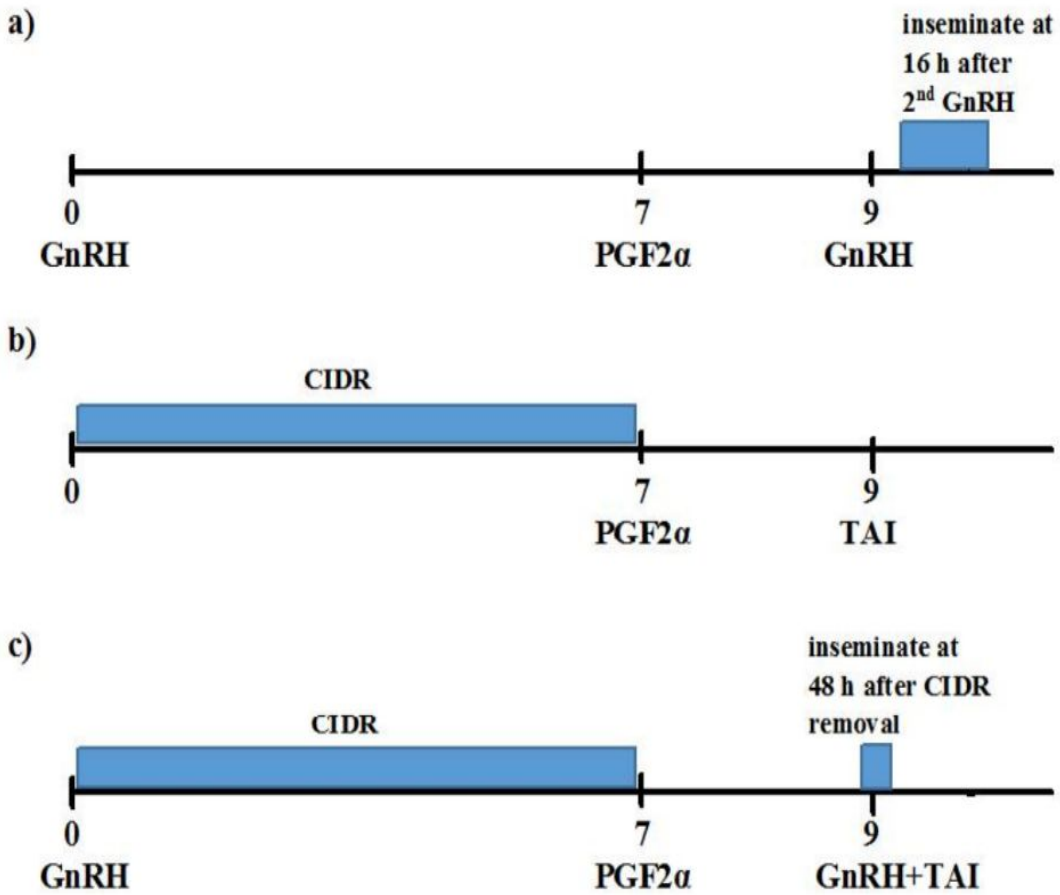


Figure 1. The schematic representation of estrus synchronization protocols a) Ovsynch, b) CIDR alone, c) CO-Synch+CIDR.

- Nondescript cows selected in Muzaffarabad.
- GnRH analogue (Dalmarelin); PGF2α ((Lutalyse); CIDR (progesterone impregnated device)
- Estrus signs: mucus discharge, vulvar swelling, micturition, restlessness, bellowing, mounting, redness of vaginal mucosa, sniffing, chin resting, aggression, standing heat
- Fixed-time AI (FTAI): 16 h after second GnRH in Ovsynch treatment and 48 h after CIDR removal in all CIDR treated animals

Shahid et al, 2021; JAPS, 31: 657

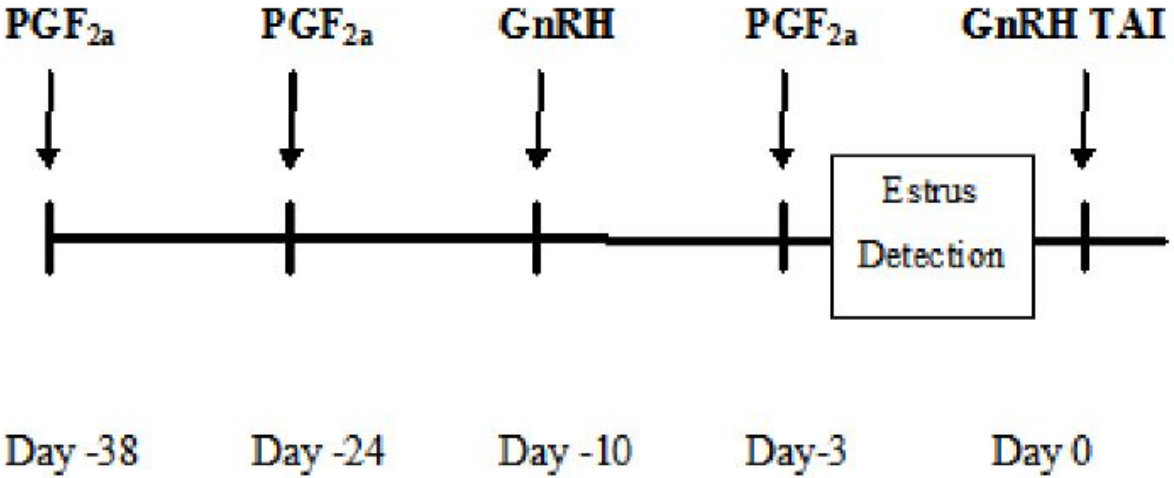


Figure 1: *Design for Presynch-Ovsynch synchronization protocol with artificial insemination at detected estrus (AIDE).*

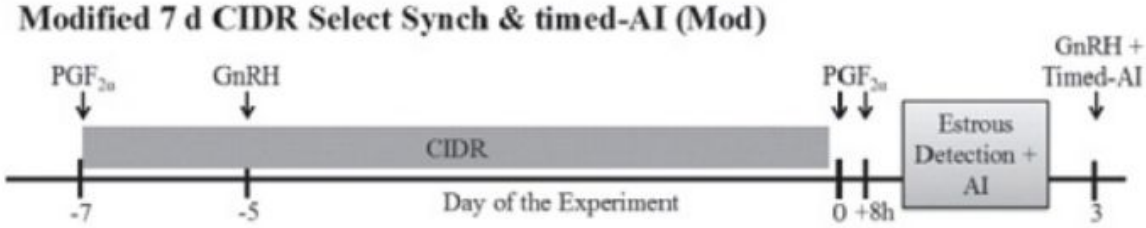


Figure 2: *Modified 7-d Select synch + CIDR and TAI (Timed artificial insemination) protocol.*

- At CBD Farm Harichand, Charsadda in Achai Cows
- POP (Presynch Ovsynch Protocol); MSS (Modified 7 days select Synch)
- Dalmazin (Cloprostenol synthetic PGF2 alpha); Dalmareline (GnRH analogue, lecirelin acetate)
- AI after 72 h of last PGF2α at detected estrus (AIDE)
- No estrus: readministered with GnRH analogue at 72 h interval, and TAI performed after 16 hr
- CIDR (P4 insert) for 7 days suppressed estrus, dominant follicles developed, improved response of dominant follicle to GnRH-2 injection.

(Khan et al, 2023; SJA, 39:211)