Oestrus synchronisation in cows

Recommended Instructor to student ratio 1:<35

Objective
To induce high proportions of cows to show oestrus within restricted times, designed by the operator, so that procedures can be carried out on predetermined days. These include artificial insemination, mating by bulls, collection and transfer of embryos, observation of oestrous and ovarian physiology etc.

Alternatives to animal use for teaching
Preliminary instruction may be given using abattoir material and visual aids but this must be applied to live animals.

Details of procedure
The procedure involves administering hormones by intramuscular injections, intravaginal devices or subcutaneous implants. Administration is also possible as feed additives but no products are currently registered for this use in Australia. Combinations of the above are often used.

The procedures act by imposing an artificial or supplemental progesterone regimen that can be manipulated by the operator to shorten or lengthen the animals’ own progesterone dominant/dioestrous phase. Additional hormones can be given at the start, during, or at the end of the progesterone phase to control follicular development and/or promote expression of oestrus. Several procedures are available as commercial products, some involving S4 classified drugs.

1. **Injections** - synchrony using injections only is achieved by giving prostaglandin (PG), which causes deactivation and regression of functional corpora lutea (CL). A single injection will result in synchrony in varying proportions (half to three-quarters) of the animals in the herd i.e. only those having CL at a responsive stage at the time of injection. Two injections, given 10-12 days apart, will produce synchrony in 95-100% of cyclic cows, by ensuring responsive CL in all/most cows at the time of second injection. PG is also often given near or at the end of the progesterone phase provided by intravaginal or implant techniques. Injection of gonadotrophins, commonly equine chorionic gonadotrophin (eCG) or pregnant mare serum gonadotrophin (PMSG), or gonadotrophin releasing hormone or analogues (GnRH), will stimulate follicle development and/or ovulation to promote expression of oestrus.

2. **Intravaginal devices** - these are known as controlled internal drug release (CIDR), progesterone releasing intra-vaginal devices (PRID®) or Cue Mate® devices. They are impregnated with progesterone and/or progestagens which is absorbed through the vaginal mucosa while the device remains in place, usually 7-12, but up to 21 days. The device is fitted using an applicator, according to instructions supplied. The end of the device should be lubricated and inserted carefully into the vagina, which has been previously cleaned by wiping the outside with disposable paper towel or similar. Cows are best restrained in a crush, but a narrow race to restrict movement is acceptable if temperament allows. Devices are removed by carefully pulling on the draw string. If the string is missing or inaccessible, the device can be expelled by using a gloved hand per rectum.

3. **Subcutaneous implants** - these are administered using an applicator, and instructions supplied. The device, impregnated with progesterone and/or progestagens, is located under the skin in the middle of the ear by injecting through a large needle on the applicator. The cow needs restraining in a head bail, to control the head and minimise risk of damage to animal and operator. Injections of oestradiol, PGF2α and gonadotrophin are usually given in conjunction with the implant. Removal is by making a small cut and squeezing the ear to expel the implant.

Drugs, chemicals, or biological agents
These are mentioned above and include various formulations (and analogues) of progesterone, prostaglandin (PG), oestradiol, pregnant mare serum gonadotrophin (PMSG), and could also involve follicle stimulating hormone (FSH), luteinising hormone and gonadotrophin releasing hormone. Some may involve S4 restrictions.

Impact of procedure(s) on the wellbeing of animal(s)
The procedures synchronise the naturally occurring event of oestrus. However the concentrated incidence of mounting activity warrants extra care during yard operations. No adverse effects are usually associated with the devices or injections, provided adequate hygiene is observed.

**Reuse and repeated use**
Within a breeding season, animals can be treated a second (or more) time to re-synchronise those not conceiving to mating at the previous synchronised oestrus. Animals can be treated in successive years with no adverse effects.

**Care of animal(s) during/after procedure**
No special care is generally necessary and animals fitted with devices rarely have any problems. Infections are rare when adequate attention is given to hygiene, but should be attended to, with veterinary advice if necessary.

**Pain relief measures**
Not necessary.

**Qualifications, experience or training necessary to perform this procedure**
Competence in handling cattle followed by adequate demonstration and instruction with the necessary observation of veterinary restrictions on S4 drugs, when applicable.

- **Demonstrator** - experience with procedures. Adequate knowledge of the physiology and anatomy involved. Demonstrators may require a thorough and extensive knowledge of reproductive physiology and endocrinology, depending on the students being taught.

- **Students** - students may be learning the techniques as part of certificate or degree courses, as technical assistants or may be livestock producers or service agents to the industry. Prior experience with handling livestock and a background knowledge in reproduction is desirable. The extent of knowledge of reproductive physiology required will vary with the intended use of techniques by the student.

**Reference**

**Relevant Links**