Laparoscopic Insemination of Sheep and Goats

This technique of artificial insemination involves the synchronization of oestrus and a single, timed insemination of ewes or does with a minor surgical procedure. The laparoscope is a rigid fibre-optic telescope, which is passed through the abdominal wall. This allows the operator to locate the internal reproductive tract and then inject the semen into the lumen of the uterine horn.

The technique bypasses the cervix of the ewe, which is narrow and tortuous and a barrier to simpler techniques of artificial insemination. The cervix of the doe is less of a barrier, but a more reliable result, with a smaller dose of semen can be achieved with the laparoscope than with cervical insemination.

Most laparoscopic AI utilizes thawed frozen semen that has been stored in liquid nitrogen. Semen can also be collected fresh from a sire on the day of AI, extended with a diluent, and then inseminated. A normal ejaculate can inseminate up to100 ewes, and a sire may give 3 or 4 ejaculates on a day.

Why use Artificial Insemination in Sheep?

Using fresh semen, situations where laparoscopic insemination is used are:

- Breeding a much larger number of ewes to a valuable sire than is possible with natural service.
- Use of a very young sire, especially where his growth is not to be slowed by paddock joining.
- Use of an old or infirm sire, where fertility for the period of joining is doubtful.
- Use of show animals where body and fleece condition must be maintained.
- Use of an outside sire where disease control denies paddock use; semen can be collected off site and transported to the AI.
- Use of a sire where semen will not freeze satisfactorily, but is useable fresh.

Most laparoscopic insemination utilizes frozen semen, for some of the following reasons:

- All of the above reasons applied to fresh semen (other than the last) are applicable.
- Purchase of frozen semen of a valuable sire.
- Use of a dead sire.
- Utilization of a share in a sire bought in partnership.
- Use of a sire that is geographically distant; interstate or international.
- Used when fresh semen collected on the day of AI is infertile or insufficient.

Laparoscopic insemination using either fresh or frozen semen is also the standard method of fertilizing embryos in routine MOET (Multiple Ovulation and Embryo Transfer) programs.

Controlling Oestrus

For the insemination of a group of ewes or does to take place on the same day, the oestrus cycle of the group must be manipulated so that ovulation occurs at a set time.

Synchronization is achieved by the use of a hormone containing intra-vaginal device and an injection of another hormone, PMSG (Pregnant Mare Serum Gonadotrophin). The intra-vaginal devices are in the form of a 'sponge' or a plastic 'CIDR' (Constant Internal Drug Release) which both contain progestagen. Whilst in the vagina, they slowly release the active hormone, stopping the normal oestrus cycle. When the device is removed after 12-14 days (longer in goats) and PMSG injected, the females all begin to cycle. Oestrus will occur 30-42 hours following removal of the sponge or CIDR with ovulation 50-62 hours post-removal. Ewes will cycle slightly earlier with CIDRs compared to sponges.

The injection of PMSG has two significant effects in females approaching follicle formation (the step in the cycle prior to ovulation). Firstly, it causes a narrowing of the time span over which animals in the group will all ovulate. Secondly, it will cause an increase in the number of ovulations each female has. This is seen as a higher percent of twins. With AI, there will be an increase in the twinning rate of approximately 20%. This increase can be controlled by adjusting the PMSG dose

Insemination

With control over the ovulation of the females, insemination of the group can be done at a set time. This is done at 48 to 56 hours after device removal, with some variation between different devices and dose of PMSG.

The females are taken off feed and water the afternoon before the insemination to reduce rumen fill.

Just prior to the AI, the does/ewes are tranquillized with a sedative/analgesic and then loaded into the AI cradles. The lower belly area is prepared by removing the wool. The AI operator then uses two trochar and cannula to penetrate the abdomen. Through one of these, the laparoscope is used to visualize the uterus in the pelvic cavity. Through the other, the insemination pipette, containing the semen is passed. The semen is placed inside the uterus by penetrating the wall of the uterus with the sharp tip of the insemination pipette.

Following topical treatment of the abdominal wounds, the female is promptly released from the cradle, and she can return to feed immediately.

A skilled operator will take approximately one minute to inseminate each animal. The professionalism and skill of the inseminator are vital components for success. The surgical approach, cleanliness, recognition of internal and uterine abnormalities, and risk assessment of infection and disease must be observed.

Management

For at least 60 days after the AI, females should not have any management procedure performed. After this, the pregnancy is reasonably strong, but remember that any drench or drug used that is embryo toxic can be devastating.

Body condition is important. Animals should be presented at AI in condition score 2 - 3 for AI, and rise slowly from the time of insemination to score 3 - 4 over the next 30 days.

Diet is important. High protein feeds should be avoided at AI and for the following month. This recommendation is based on anecdotal evidence, and extrapolation of research on dairy heifers. We suggest that lucerne and clover dominated pastures should not be used, and cereals not legumes should be used as supplements following AI.

Careful management is needed through to the end of lambing. Avoid letting females become over-fat at any stage, but have good feed during the lambing period. Ewes lambing to a one day AI program will lamb over 7 or 8 days usually beginning about day 145. The initial lambs dropped are usually the sets of multiples, with the single lambs being dropped last.

LBS recommends scanning of the AI group so that multiple bearers can be separated and receive extra feed approaching and during lambing. The survival of twins and triplets depends on milk supply and birth weights, factors related to feeding.

The level of assistance during the lambing needs to be considered. Generally, if females are used to a certain level of lambing assistance, maintain it. If the group is not usually assisted, increasing your presence can create more problems than it solves. There is a reasonable ‘storm’ of lambs or kids, and confusion increases if the mob is disturbed during this period. Predator control is essential, particularly if the AI group is lambing prior to general lambing.

At the end of the process we hope you have a good number of high quality progeny. As a minimum we expect clients to mark the same percent of lambs or kids from their AI as they mark from their paddock joining. Most of our clients mark a higher percent than paddock joining, due to the LBS experience, careful routine followed, extra feed and ‘TLC’ the AI group receive.

Results

Compared to most species, controlling the oestrus cycle of does and ewes is very successful. Ewes and does reliably ovulate in the desired time span, hence laparoscopic AI programs give very good results (60 - 80% conception rates) compared to the average for cattle fixed time inseminations (say 40 - 60%).

Good animal management and careful insemination with good quality semen frequently sees conception rates up to 80 - 90 %, and 100% conception has been achieved. On the converse, with any management problem low results are possible.

LBS prides itself on achieving the maximum conception rate in all circumstances, not in merely doing as many inseminations per day as possible. “Quality not quantity” is the aim.

http://www.livestockbreedingservices.com/services.htm