

Hormone-Assisted Synchronized Breeding for Planned Lamb/Kid Production

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Summary
There should be evaluations of the two phases of hormone-assisted synchronized breeding, pregnancy testing and hormone administration. The first is to test a conventional ultrasonic scanner against a new device, Preg-Tone, preferably with known pregnant and non-pregnant ewes/does. The second is to decide between the cyclic hormone progesterone and the prostaglandin cloprostenol as hormone mediator. Both require double administration about 12 days apart.
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Introduction

Hormone-assisted synchronized breeding for planned lamb/kid production is an activity under the LIVES intervention for small ruminants entitled 'Introduction of Planned Lamb/Kid Production'. It should have an effect of 'a seasonal mating arrangement (1-2 mating seasons) to match feed availability and achieve economies of scale for marketing'. The plan is to use a prostaglandin to induce synchronization of oestrusin the ewes and does.

There are two technical phases (presumably at the same time) –

- The ewes or does should not be pregnant so should be pregnancy tested.
- After pregnancy testing, the non-pregnant ewes and does should be provided with a hormone that will lead to oestrus about 5 days later.

Pregnancy Testing

With cattle, pregnancy can be diagnosed by rectal palpation, or better still, by detectionin the milk of the pregnancy hormone, progesterone, The latter is now in test kits and is simple. Pregnancy can be detected as early as 3 weeks post-conception. An example of the kit is Preg-O-Vet[1].

The situation with sheep is not so simple. Recto-abdominal palpation technique is not so simple and not accurate for the first two months andit can cause abortion or rectal perforation[2].Like other animals, blood tests for progesterone and a glycoprotein are feasible, but would not be preferred in a field situation. Milk progesterone can be used, even using the bovine pregnancy test kit. It should be just as useful as in cattle, as progesterone levels in milk in sheep rise on pregnancy just as they do in blood[3]. However, I presume we will not be dealing with lactating ewes/does just as we would with dairy cows.

Ultrasonic Scanning: This is the recognized technique. The recognition is to a degree that there are listed professional pregnancy testers in sheep areas in Australia. Most are farmers themselves, but as they have the equipment they can test others in their district as well as their own sheep. A number of published references indicate the technique is accurate[4,5]"High levels of accuracy (95%) have also been found using the technique even prior to 30 days post-conception"[6].

There are a number of scanners on the market, for example *Ovi-Scan*[7] and *Ibex*[2]. They are portable, combining a scanner applied to the right flank of the ewe/doe, which is attached to a monitor that visualizes the uterus. A kit of Ovi-Scan was quoted at 10,000-20,000 pounds sterling[7].

"Preg-Tone" Scanning: This is a particular form of ultrasonic scanning using the "Preg-Tone" kit[8]. It does not have a monitor, rather it emits a sound that is diagnostic for the fluids of pregnancy when scanned. It can "detect amniotic fluid present during pregnancy. When this fluid is detected, the instrument produces a loud continuous tone. When used on an animal which is not pregnant, the instrument produces an intermittent recurring tone. The intermittent tone also indicates that good skin contact is being made".

This instrument as quoted is portable, simple, and quite inexpensive, less than $500. Clearly, as such, it is highly desirable. Its comparative newness makes it hard to evaluate. I have found internet references supporting the instrument and one violently against. It is socheap, it would not cost much to test, possibly alongside a conventional ultrasonic scanner or perhaps with known pregnant and non-pregnant sheep/goats.

Synchronisation of Oestrus

The following is derived from the standard operating procedure of the New South Wales (Australia) Department of Agriculture[9] for artificial insemination in sheep. I have quoted it entirely, below, because so much of it is appropriate to our work.

It provides the two alternatives, the intravaginalpessary, the controlled internal drug-releaser

(CIDR)that releases progesterone to inhibit oestrus, and theluteolytic prostaglandin, cloprostenol,,which is easier and I understand is preferred in Ethiopia. The paper points out that a double dose regime of the prostaglandin is required as it is only effective in about half the ewes/does, those more than 4-5 days after oestrus.Cloprostenol, as Estromate (Merck)[10] example, is commonly used for this purpose in Australia in a variety of animal species.

"There are two approaches to controlling the time of oestrus in ewes.

i. Progesterone or compounds with progesterone-like activity (progestagens) are administered for 12-14 days. Due to negative feedback on the hypothalamus and pituitary, the ewes cannot come into oestrus during treatment. By the end of the treatment period, the ewe's corpus luteum will have regressed, regardless of the stage of the cycle at which treatment commenced, and cessation of the treatment should result in all ewes coming into oestrus in the next 2-3 days.

ii. There are two ways of administering progestagens. The more common way is to insert a polyurethane sponge, pessary of controlled internal drug-releaser (CIDR) impregnated with an appropriate dose into the vagina of the ewe. Less commonly, progesterone is formulated in a solid, slow-release vehicle and implanted under the skin. Ewes commence coming into oestrus 24-36 hours after removal of progesterone sponges or CIDRs, with a peak at 48 hours, and nearly all ewes should enter oestrus by 60 hours.

iii. If control over the time of oestrus is sufficiently precise, it is not necessary to use teasers and observe oestrus, the ewes being inseminated at a fixed time after sponge or CIDR removal. Usually a minority of treated ewes fail to exhibit oestrus but may still become pregnant if inseminated. The precise time of fixed-time inseminations varies with the type of synchronisation treatment, but ewes are typically inseminated at 48 hours.

iv. The second and less commonly used approach to controlling oestrus is to administer a single dose of prostaglandin. This induces luteolysis, and the ewe returns to oestrus. However, prostaglandins are only effective when given more than 4-5 days after oestrus, so in order to get all ewes into oestrus at the same time a second prostaglandin treatment must be given, preferably about 12 days after the first. Prostaglandins are only effective in ewes that are cycling regularly and may cause abortions if given during the first 60 days of pregnancy. They do not give sufficient control over the time of oestrus to enable fixed-time inseminations.

Regardless of the method of synchronisation employed, reduced fertility at the synchronisedoestrus is likely to be a serious problem. This results primarily from an effect of the treatment to depress sperm transport through the cervix and is observed after both AI and natural mating. The dose of progestogen incorporated into the sponge and the timing of insemination relative to the LH surge are important factors regulating penetration of the cervix by spermatozoa in such ewes. "

Discussion

The two phases, pregnancy testing and hormone administration, both require some evaluation. With pregnancy testing, unless testing of milk is practical, a form of ultrasonic scanning is preferred. The conventional scanners are established and used in other countries. They should be practical as portable but are expensive. The comparatively new Preg-Tone will be ideal, as cheap and potable, but it should be tested. As it is so cheap, the tests can be done alongside a conventional scanner or with animals of known pregnancy status.

Both forms of hormone intervention will need double applications, about 12 days apart. The controlled internal drug-releaser (CIDR) will need application to the vagina then removal on the second day, just before mating. The first day would also be the time of separating the selected empty ewes/does from the pregnant animals. The alternative, the progesterone cloprostenol, is administered twice so all or most ewes/does are treated successfully. Again, the first day will be that of the pregnancy evaluation. The decision in favour of cloprostenol may be already made, especially with experience in cattle in Ethiopia. The paper, above, indicates a possible infertility problem with its use. There may be cost advantages of one regime to the other.

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