Management of the reproductive cycle of dairy sheep in Mediterranean areas

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This small manual was created mainly for farmers to provide information leading to a deeper knowledge of the economic potential of dairy sheep. Created in collaboration with veterinarians and nutritionists, the authors believe that it will be a useful aid in more satisfying and economically profitable management of the flock.

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CHAPTER 1

General Information

In most of the Mediterranean area at the beginning of the 20th century sheep breeding followed the natural reproductive cycle with the mating season in late summer / autumn (September-October) and the lambing in late winter (February-March)

However the geographical position of these areas allows 10 months of reproductive activity; it is therefore possible to shift the mating season to late spring (May-June) and the lambing to late autumn (October-November) for more profitable production.

Latitude influences the reproductive cycle and in the Mediterranean area, flocks go into anoestrus * only 2 months a year, between March and April, with small variations depending on the climatic conditions.
The resumption of sexual activity takes place between May and June and is favored by male re-introduction into the flock following an isolation period of at least of 8 weeks. This phenomenon is called the **Ram Effect**

*no cycling ewes in the flock

This long breeding season, contrary to what happens in north Europe, allows the farmer to choose to have lambing and lactation in different periods of the year.

Making use of this long breeding season is essential to achieve good reproductive efficiency with improved profitability.

The reproductive efficiency of a flock is governed by two things:

the farmer and the flock.

The farmer must establish proper management practices that include:

-proper feeding and nutrition

- attention to flock health (vaccinations and anti-parasite treatments)

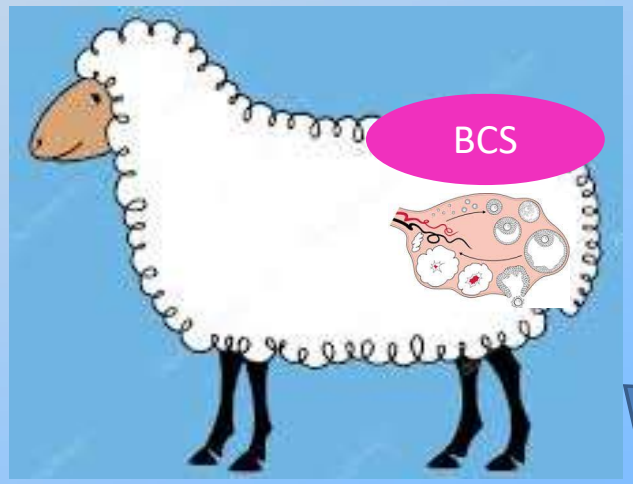
-careful scheduling of oestrus, mating and lambing

The flock must:

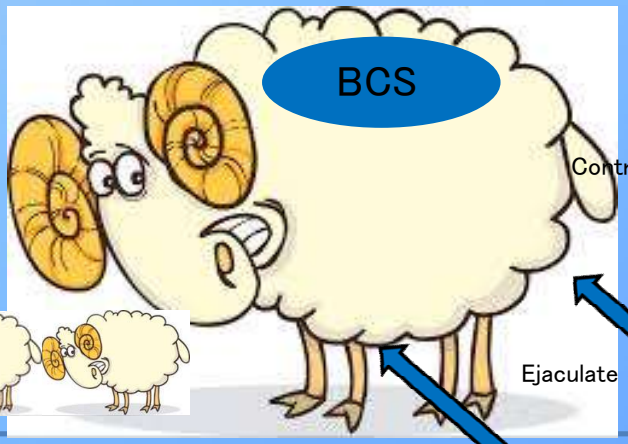
-be in good health

-have a satisfactory body score (BCS)

-have good number of fertile rams



Health check



Control of reproductive apparatus

Ejaculate evaluation

Libido Test

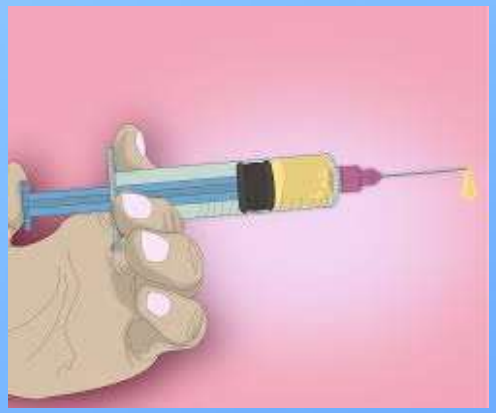
CHAPTER 2

Oestrus planning and synchronization

To maximize profit it is important that lambing and the consequent lactations take place in reasonably-priced periods. It is therefore important to carefully plan the dates and the different techniques* of the mating (natural mating, controlled mating and artificial insemination).

To properly plan for breeding it is necessary to induce and to synchronize oestrous in the flock using the male effect or hormones.

One method does not exclude the other and sometimes the best result is achieved with a good mix of both



Male Effect

The male effect is the physiological response of the female to the sudden re-introduction of the males at the end of anoestrus (April-June), after a period of isolation of at least 8 weeks. It can be used only at the beginning of the breeding season and induces the resumption of ovarian activity and fertile heat in about 17-24 days after the introduction of the males.

The beginning of estrous is also favored by:

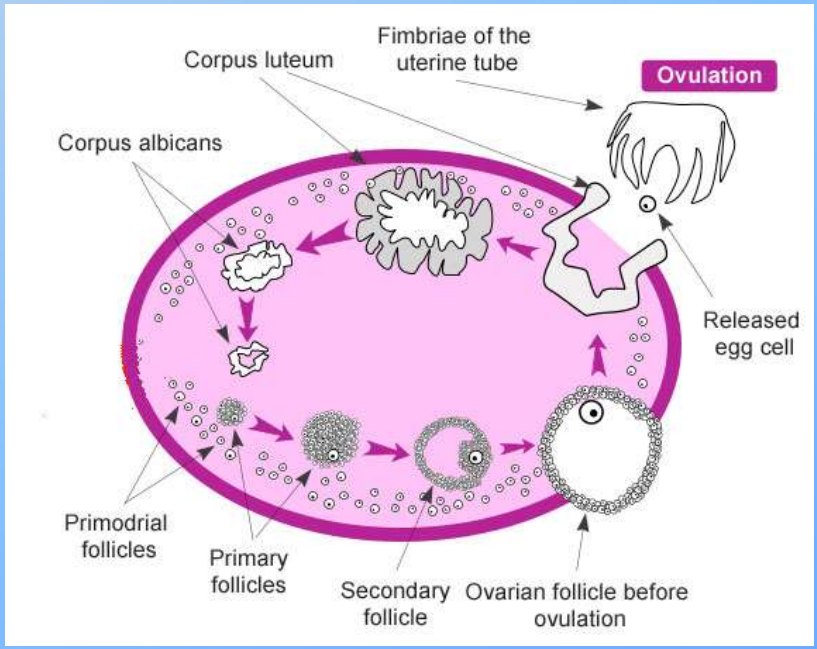
-a male / female ratio of 1 / 16-20;

-good libido in the males;

-age between 2-5 years old;

-at least 5 months since last lambing

The male effect can only be used at a precise period of the year between the end of anoestrous and the beginning of the breeding season.



Hormones

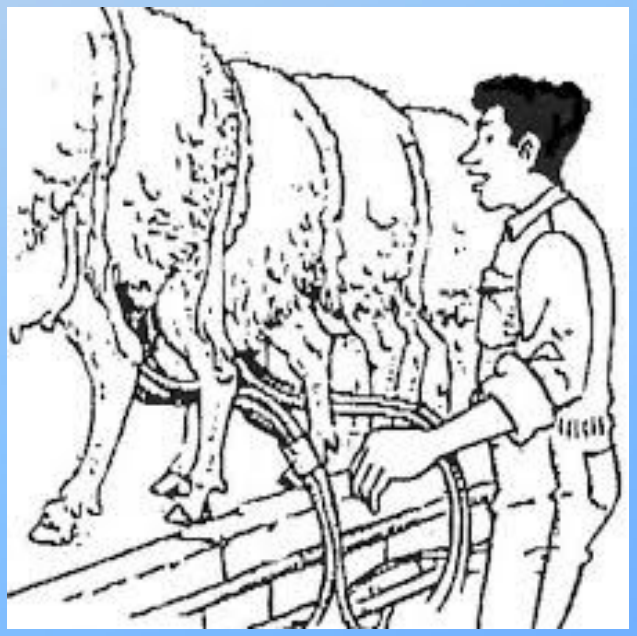
Hormones, unlike the male effect, can be used effectively at any time of the year ensuring a very precise concentration of lambing.

The treatment traditionally involves the use of intravaginal sponges for 14 days plus intramuscular injection of PMSG (pregnant mare serum gonadotropin).

CHAPTER 3

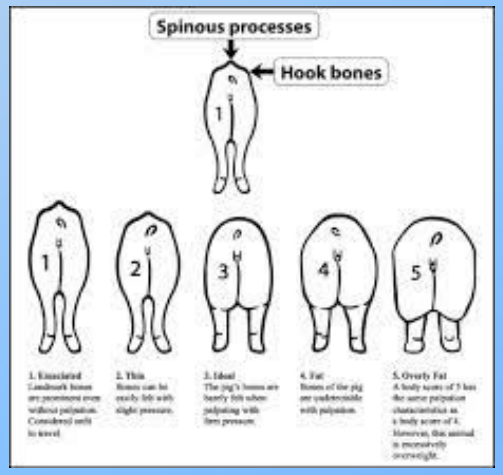
Flock mating preparation

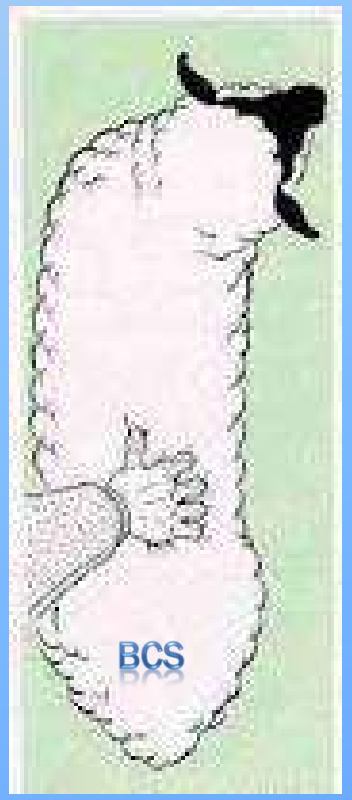
After lambing and weaning, the sheep go into full milk production. During this period health checks and adequate nutrition are essential in order to optimize milk production and to ensure that animals arrive in good condition at the next breeding season.



Breeding should be planned at least 2 months in advance, checking the health of the ewes (parasites and infectious diseases), body weight and BCS (body condition scores). Animals that are not in optimal condition should be given supplementation (p. 19) or dietary flushing (p. 20).

It will also be necessary to evaluate the number of males needed for the mating and check their health status, body condition and BCS.





male / female ratio

The desired ratio of males/females varies according to the breeding program used.

To summarize:

- if the sheep have not been synchronized, with hormones or male effect, for every 100 females 4-6 males are required

- if the sheep have been synchronized with hormones, for every 100 females 15-18 males are needed to make sure that all the females are mated at the first induced cycle

- if the sheep have been synchronized with the male effect, for every 100 females 10-15 males are needed

-when forming a breeding group with a single ram so that the paternity of the lambs is known, 1 male is needed for every 16-25 females.

Rescue BCS during lactation

The fertility of the flock (number of sheep born / number of sheep bred %) depends very much on the body condition (BCS) of the sheep at mating. Sheep that are too thin (BCS less than 2.5) or too fat (BCS greater than 3.5) are often sterile or give birth later than intended. Energy and protein demands of lactating ewes are normally not completely covered by feed ingested. Under these conditions, body reserves are used in milk synthesis. It is important to ensure that the deficit is as small as possible.

BCS at weaning should not fall below 2.5, allowing for the recovery of BCS to optimal values for high fertility (BCS = 3) by the next breeding cycle.

If at 2 months from the beginning of mating the sheep have a sub-optimal body condition (BCS less than or equal to 2.5) it is necessary to increase dietary supplements (for example adding 200 g of corn or 250 g of barley/head/day) or offer more high-quality grass to promote recovery of the BCS.

Food Flushing

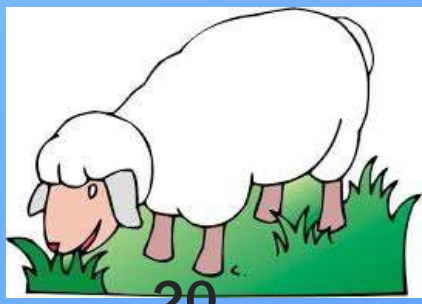
Food flushing is hyper-feeding of the animal generally based on an offer of extra concentrates such as: sweet lupine, soybean extract flour, glycogenics (glycerol and propylene glycol) or mixes based on flaked cereals and soybean extract flour near the time of breeding or artificial insemination in order to maximize the number of live births.

Three types of flushing can be distinguished:

- Long Flushing (5 weeks), to improve the body weight of animals near the breeding season (2 weeks before and 3 after the introduction of the males)

- Medium Flushing (2 weeks pre-breeding/AI), to improve the general condition of the animals before the introduction of the males

- Short Flushing (4-7 days) to be used only:
  -with the use of hormones
  -with the male effect



CHAPTER 4

Reproduction programs

The farmer has two methods to set up the reproductive program:
ram effect or **hormones**

The breeding program using the male effect is applicable **only at the** beginning of the breeding season (April-June) however it is low cost, it has low environmental impact, can be used in organic farming and the milk can always be used.

The hormone-based breeding program is applicable **throughout the year,** however it is expensive, cannot be used on organic farms and the milk produced during the treatment cannot be used.

Reproductive program using the male effect

how do you do it?

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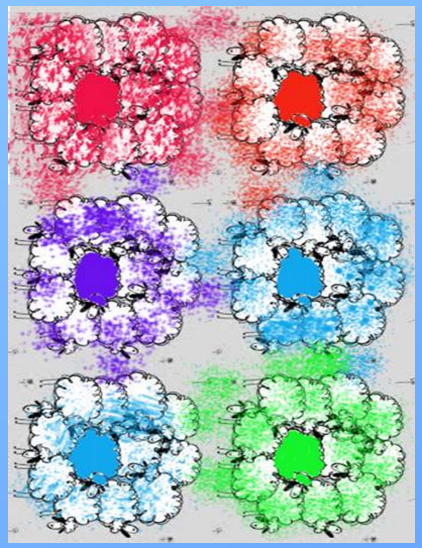
- Separate the males from females for at least 8 weeks (away from sound, sight and smell)
- Re-introduce the males into the flock (Day 1), until the end of breeding, then :
- Day 10: shear the rams
- Days 13-14: prepare the breeding groups
- Days 16-17: equip the rams with marking harnesses (colored crayons)
- Days 18-24: the animals should start mating

What is happening?

Within 72 hours of the introduction of the rams the females will have a silent ovulation not detected by the males; at 19-22 days one part of the flock will have fertile heat and will be mated, another part will be mated a few days later: after 23-26 days.

To have concentrated lambing it is essential to maintain a correct male / female ratio, which is usually 1M / 16-20F. If the number of females for each male is increased (1M / 40-60F), the ram will be forced to mate the females over more cycles.



It is important to record daily the number of the sheep marked with a crayon by the male who mates them.
Generally, two to three years after its introduction into the flock, the male effect will give its best results in terms of synchronization and concentration of heat and therefore of lambing. This is because the flock adapts its biological rhythm to the technique and the farmer becomes familiar with it.

Reproductive program with hormones

This program allows you to choose between two distinct treatments: synchronization with long hormonal treatment and synchronization with short hormonal treatment. The long treatment can be used at any time of the year, even in anaestrus, while the so-called short treatment can only be used during the breeding season

For more information see: http://www.ara.sardegna.it/system/files/documenti/Tecniche%20di%20alimentazione.pdf

The organization of the lambing calendar may vary according to the farm needs

Examples:

- **Lambing at the end of September:**

Introduction of rams at mid-April, possible only on farms where lambing is generally very early, takes advantage of the male effect at the beginning of the season

- **Lambing at the end of October:**

Introduction of rams in mid-May, takes advantage of the male effect at the beginning of the season

- **Lambing at the end of March:**

Introduction of rams at mid-October, takes advantage of the natural sheep cycle

- **Lambing in May:**

Introduction of rams in December, takes advantage of the natural sheep cycle

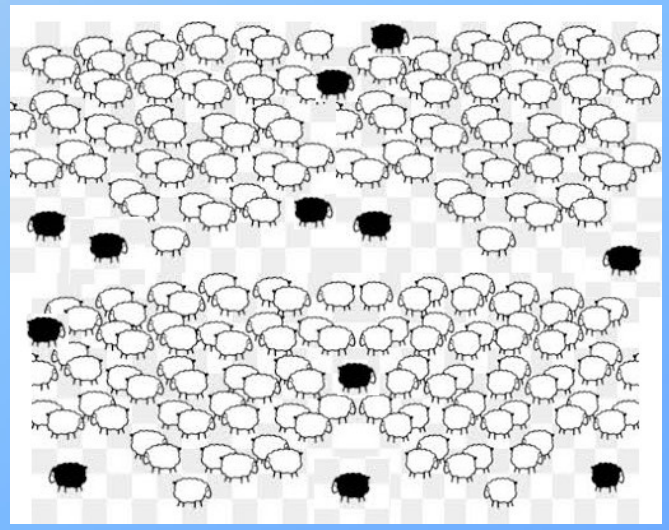
CHAPTER 5

Practical suggestions

Natural Mating

how you do it?

- Introduce males into the flock at the beginning of the breeding season to stimulate heat. If you prefer you can use an anti-mating apron on the rams.
- Take off the apron 14-15 days after introduction and equip the rams with marking harnesses so that you can recognize the mated sheep.
- It is advisable to separate the mated sheep every day to avoid repeated mating.
- A male with a marking harness should be left with the flock at the end of breeding to cover sheep that are not yet pregnant, thus allowing an early diagnosis of pregnancy. All the sheep not re-marked can be considered pregnant, but it will be necessary to confirm the pregnancies with ultrasound.



Controlled Mating

how you do it?

- Put the breeding males in single boxes, with no possibility of seeing each other.
- The female, identified in oestrus by teaser rams, is taken to the box of the ram selected.
- The female synchronized with the hormones will be taken to the ram's box 48 h after sponge removal. At least two services per female are suggested.

- After service, remove the female from the box.

- No more than 4-6 females per day per male, with at least one or two weekly rest days alternating with mating days

- service early in the morning is best

What to do after mating?

It is essential to check the return of oestrus for at least another 2 - 3 cycles in the following way:

Selective mating: leave a tester ram in an anti-breeding apron and marking harness with the flock to indicate the sheep in heat which can then be bred to the preferred rams.

Natural Mating groups: leave the fertile rams in marking harnesses to identify the females who are returning in heat
In this way we will know:
how many sheep HAVE NOT returned in heat (therefore presumably pregnant and with a certain date of delivery) and how many sheep HAVE returned in heat

Out of season flock

Reproduction out of season requires managing at least two or three lambing dates by dividing the flock into two or three groups in order to have milk and lambs through out the year.

To do this it will be necessary to plan a May-June breeding group with lambing in October as well as a second breeding group in September-October with lambing in February-March. A third group bred in December would produce lambs in May.

In Conclusion:

To organize the breeding system in a profitable way the breeder must:

-Decide on the best time for lambing. The dates of the lambing and their distribution will mainly influence farm income.

-Monitor the health and nutritional status of the flock in time and adjust the diet, if necessary, for the recovery of body condition;

-Apply reproductive and feeding techniques to optimize reproductive results (fertility and fecundity), using an optimum male / female ratio, handling the breeding and introducing flushing feeding when necessary.

-Properly monitor reproductive results during the breeding campaign, using marking harnesses and ultrasound

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