



Year-Round Management of Rams for Successful Reproduction

Year-round management of rams for successful reproduction

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Content

Fit sires for successful reproduction	1
When selecting or purchasing	2
Feed males for fertility	3
General clinical exam: do it yourself	4
Body condition scoring (BCS)	5
Body condition score grid	6
Eyes and nose	7
Mouth and Teeth	8
.....	8
Feet and legs.....	9
The reproductive organs should be periodically examined and palpated.....	10
Scrotum	10
Testicles	11
Epididymis.....	12
Prepuce.....	13
Semen assessment.....	14
Get advantage of ram lambs	15
References and suggested further readings	16
Acknowledgements.....	17

Fit sires for successful reproduction

This field guide aims to increase the awareness of small ruminant farmers in evaluating the mating ability of rams and on how to select and/or purchase good breeding males.

The examination of rams for mating ability is an important step towards improving flocks' fertility and avoiding disease transmission. The impact of addressing the rams' reproductive performance prior to the mating season is important as fifty percent of the reproductive potential of a flock is provided by the ram (McLaren, 1988). The rams should be monitored regularly during the year and not only during the mating season.

Do not neglect rams throughout the year and then expect them to perform during the mating season. A mature, fit, healthy ram can serve 40 or more ewes during a breeding season. An unthrifty, thin, sick ram is often sterile and will not settle any ewes. This ram will transmit diseases and/or will give bad descendants. Except for systematic, time-consuming analyses for sperm and laborious serving capacity tests, most of the problems adversely affecting the reproductive ability of rams can be easily detected through a careful physical examination (Mozo et al., 2015).



A community-selected ram in Bonga, Ethiopia

When selecting or purchasing

The breeding ram should have a known origin (non-contaminated flock and certified or at least known parents). A breeding soundness exam includes visual appraisal of general health and condition, as well as a soundness check on feet, legs, eyes, teeth,

jaws, etc. When purchasing rams, a veterinary examination will be of great help to detect any health trouble. Buying a ram has a cost but if he brings in a disease, the expenses have just started!



Testing rams for diseases in Bako (Shambu CBBP site), Ethiopia

A comprehensive examination of genital organs should be performed including a scrotal circumference measurement, testicle and penis

examination. Where possible, males should be assessed for semen production and viability. Breeding soundness should be performed at least two months before mating to allow recovery of rams from pathologies or poor physical conditions.

Feed males for fertility

To maximize testis mass and therefore quantity of sperm produced, males need to be fed a grain-based supplement each day for 8 weeks before mating. Concentrate-fed rams are prone to the precipitation of mineral elements in their urine. An important issue here is the concept of 'fit but not fat' – males that are overweight and do not get exercise can perform poorly, even when they have maximum testicular mass.

Energy allowance for breeding rams is 110-120% of the maintenance requirement. Metabolisable Energy for Maintenance is 93 Kcal/ kg of metabolic live weight ($\text{weight}^{0.75}$).



Fit Awassi ram in the Jordan Badia

If the sheep flock is synchronized (use of hormones or by the ram effect) and instead of the males having to serve 5-6% of the females every day, as happens during an ordinary mating season, they might encounter as many as 30% of the females in estrus on some days.

In addition, rams should be sheared, treated for internal and external parasites and have their feet periodically examined (every two months for example) and - if needed for a good aplomb - trimmed and/or treated before turning in with the ewes.

General clinical exam: do it yourself

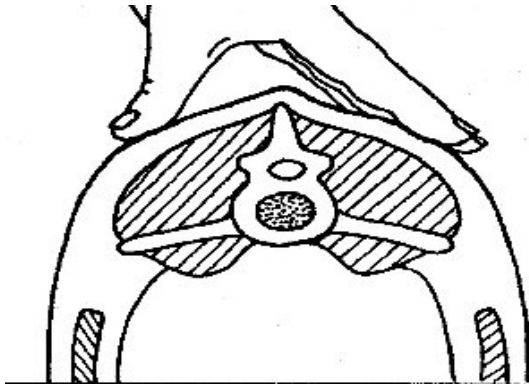


Body condition scoring (BCS)

Condition scoring is a simple effective technique that is worth adopting to determine feeding levels for rams. Frequent scoring with appropriate feeding:

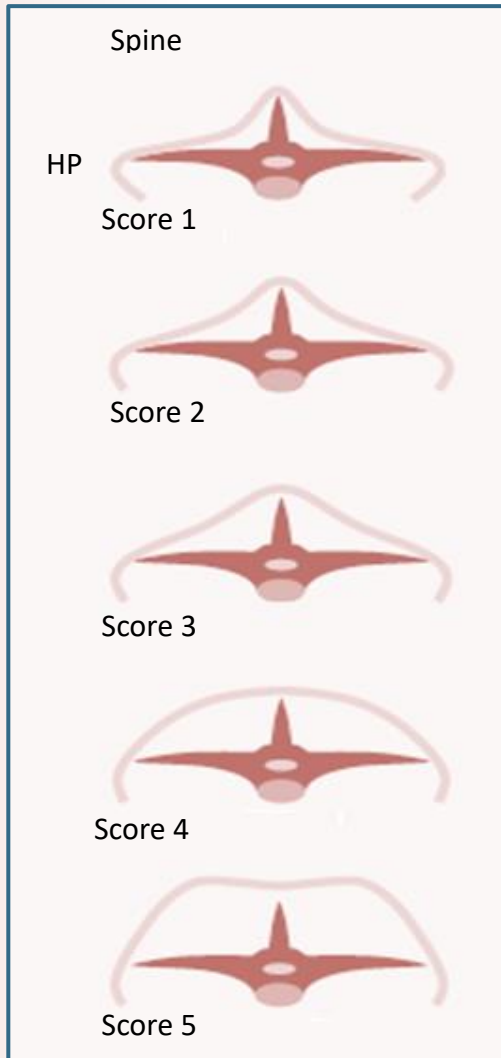
- Minimizes welfare problems
- Reduces losses
- Maximizes longevity and mating success

First assessment of the BCS should be carried out at least 2 months before the start of the mating season which allows sufficient time to correct the feeding regime and achieve target BCS 4, preferably. Rams are less hardy during the mating season and they are exposed to losses of BCS. Severe loss of condition during the mating period of up to two units of condition score endangers ram welfare and may predispose animals to respiratory disease and other infections.



BCS assessment at the lumbar region

Body condition score grid



Score 1: Spine prominent and sharp, fingers easily pass under horizontal processes (HP). ***Too thin, possibly diseased.***

Score 2: Spine prominent and smooth, fingers go under with pressure. ***Too thin, hard used rams, needs supplementary feeding.***

Score 3: Spine smooth and rounded, fingers need pressure to find ends. ***Acceptable condition for mating under good feeding conditions.***

Score 4: Spine detected as a line, HP are not felt. ***This is the optimum body condition score at the start of mating season***

Score 5: Spine not detectable, fat dimpled over spine, HP not detectable. ***Grossly overfat,***

Eyes and nose

Eyes: should be checked for any abnormality: presence of ocular lesion, anemia (pale conjunctiva), icterus (yellowish conjunctiva) or any eye discharge.

Nose: should be slightly humid with no discharge of any type. Its movements should be regular and not very perceptible.

Notify to the veterinarian any abnormal sign.



Abnormal pale conjunctiva



Severe purulent nasal discharge

Mouth and Teeth

Mouth should look normal with no symptoms of hyperkeratosis, any pustules or crusty lesions. Rams with several broken teeth or abnormal dentition causing difficulties in mastication should also be culled. This is particularly important for rams grazing dry, gross material.



Normal dentition



Partly broken teeth (left panel) and severe loss of dentition (aged animal; right panel)

Feet and legs

Rams should have normal feet and legs for good standing positions during mating. Rams with lameness, foot rot, foot abscess, inter-digital growths or with non-trimmed hooves should be promptly treated.



Borrowed from S. Allan (2010); A chronic case of foot abscess with a discharging sinus



Infectious foot rot



Hooves trimming

The reproductive organs should be periodically examined and palpated

Scrotum

Scrotal circumference is an indicator of male fertility and serving capacity. Rams with normal, large scrotal circumference produce more and higher quality semen than rams of the same age and breed with small diameter. Daughters from sires with a larger testicle circumference are more fertile than females sired by males with a smaller circumference. The scrotum is first examined for dermatitis, wounds, edema...

When measuring scrotal circumference, it is important that both testicles are fully descended, with no deformation or adhesences to the skin. The measurement is taken at the point of greatest circumference.

Guidelines for relationship between scrotal circumference and age of the ram are breed-dependent and therefore, such grids should be developed based on a large number of measurements using normal fit rams. For Ethiopian sheep breeds (Horro, Bonga and Menz), average scrotal circumference increases from 25 cm at 1 year of age to nearly 30 cm at 4 years of age. For larger breeds like Awassi, target scrotal circumference is 36-38 cm between 2.5 and 3 years of age.



Testicles

Testicles should have the same size (symmetric) and move freely inside the scrotal bag; their mass should be firm, but not hard, with no indication of abscesses, injuries or any other condition. All these abnormalities affect fertility. All rams with testicular abnormalities, affecting even one testicle should be culled. Rams with only one testicle (monorchid) are sub-fertile and should not be kept for breeding even if you like their conformation and sexual aggressiveness.



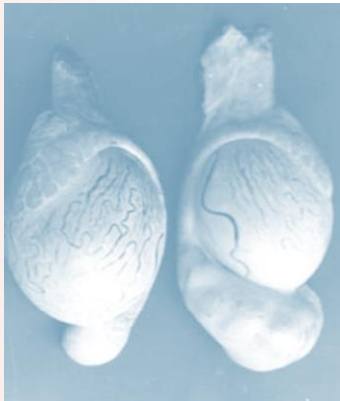
Palpation of the scrotal bag to assess testicles condition (left panel); Starting up in the cords above the testicles to examine the epididymis (right panel)

Epididymis

Epididymitis mainly caused by *brucella ovis* results in infertility and sterility in some affected rams. It may cause abortion in a variable percentage of ewes.

To examine the epididymis by palpation, rams can be examined in either a standing or sitting position. The neck of the scrotum is grasped between the thumb and forefingers, feeling for any swelling or lumps. Any lesions (lumps, abscess or any other lesion) in the spermatic cord or the head of the epididymis will be felt in this area.

	Brucella ovis-free	Brucella ovis-infected
Rams (n)	84	94
% sperm motility	66	29
% normal sperm	86.5	55.5
% detached heads	6.9	25.5



Borrowed from J.W. Plant and J. Seaman (2007). Swellings visible on the tail of the epididymis of the right testes, the left testes is normal.



Swellings visible on the whole epididymis of the right testes, the left testes is normal.

Prepuce



When assessing the reproductive organs, the opening of the prepuce is examined for any lesions or sores that would interfere with penis erection such as injury, stricture and adhesion. The most common problems or conditions affecting ram prepuce are "pizzle rot" or infection with herpes virus. Pizzle rot results from feeding of high protein diet and acidic urine, creating sores at the prepuce opening. Both conditions, because of elevated white blood cells, may indirectly decrease ram fertility.



Healthy prepuce and glans (upper panel); penis shows lesion indicative of posthitis (inflammation of the prepuce and penis; lower panel)

Semen assessment

Under veterinarian assistance, a semen sample can be collected from rams by using an electro-ejaculator or an artificial vagina. Collected semen is examined under a microscope to estimate the percent live spermatozoa ($> 70\%$), motility score (> 3.5 out of 5) and percent abnormal sperm cells ($< 15\text{-}20\%$). As this action is costly, several neighbor animal keepers may want to consider pooling their efforts to attract a veterinarian to a centralized location and perform the analyses for all the rams. Costs could then be shared between several producers.



Semen collection using artificial vagina



Field arrangement for instant semen evaluation

Get advantage of ram lambs

Ram lambs can be used on a limited, but successful basis in a breeding program as they are source of valuable genetics. A well-developed 7 to 8 months old ram lamb can be bred to 15-25 ewes and even much more if being used in artificial insemination. Ram lambs need to be monitored closely during the breeding season to avoid domination by more experienced rams. One method that can be successfully used is to turn them in with the ewes only in the evening and at night. This requires daily observation in the beginning that yearling rams are effectively mating with sheep. For seasonal breeds (with a very restricted mating season in autumn), a treatment with melatonin for 7 to 8 weeks prior to the start of the mating season enhances semen production and quality and boosts sexual aggressiveness of yearling rams (Rekik et al., 2015). Each ram should receive 2 implants containing each 18 mg melatonin (Melovine® or Regulin®; CEVA animal health) 6 weeks prior to joining.

	Melatonin-treated	Control
Scrotal circumference (cm)	32.1±1.54	29.5±1.0
Sperm concentration (10 ⁹ spz ml ⁻¹)	5.87±0.703	4.61±0.654
Testosterone pulse frequency/8 h	3.45±2.24	1.25±1.0
Mount attempts/15 min	1.8±0.44	0.2±0.44

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