

ALL about Goat Farming!

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The birth status of a lamb can be determined by scanning the pregnant ewes six weeks after the rams have been removed.

The carrying capacity is determined by many factors and it is therefore impossible to give an accurate figure. If the annual rainfall is approximately 550 mm on very good veld, about one goat per hectare can be kept. (Obtain more accurate figures from farmers in the vicinity.)

Research shows that more rapid genetic progress can be made with reproduction rates by selecting ewes that wean multiples, regardless of whether she was born as a singleton. Use only rams whose mother weaned 1.5, but preferably twice as many lambs as she had lambing opportunities. To determine twins, get in touch with your veterinarian to scan the ewes.

FEEDING PROGRAMME FOR SHEEP AND GOATS UNDER EXTENSIVE AND SEMI-INTENSIVE CONDITIONS

The aim of this article is to give only broad guidelines for a feeding programme for sheep and goats under extensive and semi-intensive conditions.

1. Flush feeding of breeding rams

Producers are often prepared to pay considerable amounts for breeding rams, but are sometimes not willing to take extra trouble as well as spend a few rand to prepare these animals properly for ensuring maximum reproduction rates. To ensure high conception and a high percentage of twin births, rams must be in excellent condition (3.5 to 4.0 CP); be fecund and adroit in mating; possess a very high libido and be top fit to mate frequently with ewes during their oestrus cycle, and also have large testes (scrotum circumference of more than 35 cm at 15 months of age) to produce adequate sperm cells. As the development of sperm cells takes approximately two months, supplementary feeding must be provided for at least two months. From two months before the mating season breeding rams must therefore be fed a flow-through protein-based ram flush ration such as **Voermol Superlamb Pellets** or a ram flush mixture (200 kg **Voermol SS 200** + 150 kg **Voermol Procon** + 80 kg **Voermol Molasses Meal** + 575 kg milled mealies or whole barley kernels) at a limited level (500 – 1 500 g/ram/day). There must be adequate feeding space (\pm 60 cm/ram) so that all rams can feed simultaneously. If grazing is scarce, good quality lucerne **hewe** must be added separately *ad lib*. As an alternative, a full ram ration [250 kg milled lucerne (25 mm) + 425 kg milled mealies or whole barley kernels + 200 kg **Voermol SS 200** + 50 kg **Voermol Procon** + 80 kg **Voermol Molasses Meal**] can be fed.

As soon as supplementary feeding commences, exercising the rams (30 minutes fast walking twice daily) must be started. Where experienced (fit) rams were mated with ewes, the conception of the ewes was 92% versus the 76% of the inexperienced rams' ewes. All other activities such as the required dosings (for both roundworm and nasal bot) and vaccinations (e.g. multiclostridial vaccine) must be conducted approximately six weeks prior to the mating season. In addition, Multimin™ (G1853) as well as Vitamins A and E must be injected three months before the mating season, while vaccinations that cause fever, such as blue tongue, must be injected after the mating season. Sufficient cool and clean drinking water must be available at all times and be as close to the shade as possible. Provide shade in warm months and shelter against inclement weather conditions. Sperm quality of breeding rams can be improved by dosing them from eight weeks before the mating season with wheat germ oil (\pm 25 ml/ram) two to three times a week.

2. Raising replacement ewes (young ewes)

To ensure a high lambing percentage, ewe lambs should lose no mass from weaning until they lamb for the first time. They must furthermore weigh 80% of adult body mass at first mating if they are mated for the first time at 12 months or younger. If mating occurs at older than 12 months, the target mating mass must be 90% of adult body mass. The optimal raising of replacement ewes is necessary for unlocking their full genetic production and reproduction potential. Where Döhne merino young ewes reached 80% of the adult ewes' mass at mating at 11 or 14 months of age, 55% of these young ewes were pregnant with twins. **Young ewes must therefore always receive supplementary feeding**, from weaning up to weaning their first lambs, after which they can be included in the adult ewes' feeding programme.

Depending on the quality and the quantity of the pasture, the young ewes must be fed the following power feed mixture on both dry pasture (500 to 1 000 g/ewe/day) and green pasture (100 to 500 g/ewe/day): **200 kg Voermol SS 200 + 50 kg Voermol Procon + 40 kg Voermol Molasses Meal + 700 kg milled mealies or whole barley kernels**. By weighing the young ewes or a marker group regularly every two to three weeks, the feeding level of the power feed supplement can be regulated such that the calculated growth rate is maintained to reach the target mass on first mating. Feed this power feed supplement daily with feeding space ($\pm 35 - 44$ cm/ewe) for every animal to ensure optimal development of young ewes. Weaned ewe lambs raised on forage maize or maize harvest residues with plenty of kernels, must be fed on **Voermol Landelek** (150 – 200 g/ewe/day); a better mixture is **150 kg Voermol Landelek plus 50 kg Voermol Procon** (250 – 350 g/ewe/day). On standing soya **hewe** (unharvested soya beans) or on soya harvest residues with plenty of kernels, **Voermol Molovite** (200 g/ewe/day) is recommended. For every one kg a ewe is heavier at first mating, her lambing percentage increases with approximately 1.5 to 2.5%. To ensure a high lambing percentage, young ewes must be in an excellent condition (3.5 CP) at first mating and have reached their target mass at first mating. Furthermore, the highest lambing percentage is obtained if the feeding level of young ewes is increased as early as two months before the mating season by placing them in reserve camps and continuing with the above power feed supplement up to 21 days before the mating season, when flush feeding is switched to.

3. Flush feeding of breeding ewes

Ewes that increase mass at mating are more inclined to produce twins than those who maintain or lose mass. Conception and twin births decline if the ewes lose mass just before the mating season. Ovulation rate (number of ova released per oestrus cycle) determines the upper limit of the ewe's fecundity (multiple births) and it is controlled genetically. The extent to which a ewe reaches her genetic reproduction potential depends on environmental factors such as feeding and management (Downing & Scaramuzzi, 1991). According to Rowe and Atkins (2005) feeding has the greatest influence (>70%). Therefore, to ensure a high lambing percentage, ewes must be in an excellent condition (3.5 CP) at mating and for every kg they are heavier at mating, the lambing percentage increases by approximately 1.5 to 2.5%. To get ewes into increasing their mass, they must be placed in reserve camps two months before the mating season and fed a flush lick at least three weeks before the mating season for at least six weeks.

On dry pasture **Voermol Maxiwol Production Pellets** is fed as a flush lick at 300 to 400 g/ewe/day. Maxiwol Production Pellets must not be fed where the drinking water is brackish or where many *Salsola spp.* (brakbossies) occur, as it would cause insufficient lick uptake. No salt lick or saltpetre should therefore be fed. On green pasture or where the drinking water is brackish or where many *Salsola spp.* (brakbossies) occur, a Maxiwol lick mixture (**250 kg Voermol Maxiwol Concentrate + 200 kg milled mealies or whole barley kernels + 50 kg salt**) must be fed at 300 to 400 g/ewe/day as a flush lick. When teasers are used, the feeding level of the flush lick for adult ewes can be decreased by the fourth week of the mating season to 250 g/ewe/day and the next week to 200 g/ewe/day. The latter is

maintenance feeding level and should be sufficient for early pregnant adult ewes if adequate pasture is available until the rams are removed. If teasers are not used, the flush feeding level must only be decreased from the sixth week of the mating season. The reason for decreasing the flush feeding level is that research shows that the highest embryo survival occurs where ewes are fed at a maintenance feeding level shortly after conception, whereas, until the rams are removed, the flush lick for young ewes is supplied at the same level (300 g/ewe/day) as`

tain their recommended target mass increase (± 70 to 180 g/ewe/day). Any mass loss must be prevented among both the young and adult ewes during the mating season as it may cause embryo resorption. The latest research shows that it is economically justified and non-negotiable to supply flush feeding to ewes that lambed twins in their last lambing season, as well as to young ewes that are mated for the first time. The rest of the ewes are fed flush feeding if they are thin or skinny (< 3.0 CP), but not if they are in excellent condition (3.5 CP) because that would not be economically justified.

Ewes must be injected with Multimin™ (G1853) plus Vitamins A and E four to six weeks before the mating season, as well as be given the required dosing and vaccinations (multiclostridial vaccine and enzootic abortion). From four weeks prior to the mating season ewes must be kept peaceful and no stressful activities must be conducted during this period. Where ewes were shorn and dipped two to four weeks prior to the mating season, the conception was 89% as a result of these stressful activities versus 96% where these activities were conducted more than four weeks before the mating season. Where ewes are driven over a long distance just before mating, the resultant stress lowered their ovulation rate by 60%. Avoid the mating of ewes on clover and lucerne pasture that suffer from moisture stress, are damaged by insects or infected with viruses or fungi because these plants produce hormones under these circumstances that may detrimentally affect the lambing percentage.

4. Feeding during early pregnancy

Any factors that may cause tension must be avoided during early (first month of) pregnancy, as it may lead to embryo mortalities. Where ewes are handled during mating by bringing them to the enclosure every fourth day for identifying mated ewes, their lambing percentage was 65% versus the 98% of the ewes that were not handled. To prevent embryo mortalities and dieback of the foetuses, where possible, no stressful activities (e.g. dosing, vaccination, shearing, dipping, etc.) should be conducted during the mating season until at least one month after the rams have been removed. The difference (also known as the disappearance factor) between the number of lambs scanned and those actually born (dead and alive) is an indication of the embryonic and foetal losses (foetuses that dieback) and can easily be as high as 23% and even higher.

During the first month of pregnancy adult ewes must maintain their mass while young ewes must increase in mass by approximately 70 to 180 g/ewe/day (NRC, 2007). Owing to the risk of resorption, ewes may not be weighed during early pregnancy. The use of teasers is highly recommended because it will make flush feeding even more profitable. Where ewes receive flush feeding (300 g/ewe/day) for six weeks from three weeks before the mating season, adult ewes' feeding level is adapted after six weeks of flush feeding if teasers are used. Where teasers are used, the feeding level of the flush lick for adult ewes can therefore be reduced to 250 g/ewe/day and the next week to 200 g/ewe/day by the fourth week of the mating season. The latter is a maintenance feeding level and if adequate pasture is available, it should be sufficient for early pregnant adult ewes until the rams are removed. If teasers are not used, the flush feeding level must be reduced only from the sixth week of the mating season. The reason why the flush feeding level must be reduced is that research shows that the highest embryo survival occurs where ewes are fed at a maintenance feeding level shortly after conception. On the other hand, until the rams are removed, the flush lick for young ewes is supplied at the same level (300 g/ewe/day) as for flush feeding to maintain their recommended target mass increases.

Any loss of mass must be prevented among both young and adult ewes during early pregnancy, as it may result in embryo resorption. When the rams are removed, the supplementary feeding level of both the young and adult ewes is adapted and usually switched to other licks. The licks must ensure that a moderate mass increase must be maintained during mid-pregnancy (refer to Mid-pregnancy, Section 5). Keep ewes peaceful and stop all activities during the mating season and the first few weeks ($\pm 4 - 6$ weeks) after the rams have been removed to limit embryonic and foetal deaths (Henderson, 1990). Provide shade (in the form of trees or shade-netting) if the day temperature exceeds 28 °C, but is definitely more than 32 °C. Ewes must have free access to clean and good quality drinking water as close

to the shade as possible. Much brackish and salt water increases the heat stress that raises the risk of embryonic and foetal losses.

5. Feeding during mid-pregnancy

During mid-pregnancy (months 2 and 3 of pregnancy) the optimal growth of the placenta (after-birth) is of critical importance. A small after-birth causes an increase in lamb deaths owing to lambs being too small (below 3.5 kg) at birth as a result of poor viability of the newly born lambs; poor mothering traits and a low milk production of the ewes (Kelly & Ralph, 1990). The placenta produces hormones that are essential for the maintenance of pregnancy; development of the udder and the stimulation of mothering traits. A decrease of up to 25% in milk production was observed among ewes that were underfed before Day 100 of pregnancy, regardless of having received *ad lib.* feeding during the last six weeks of pregnancy (Mavrogenis *et al.*, 1980).

During the second and third month of pregnancy adult ewes with single foetuses must increase in mass ± 50 g/day; those with twin foetuses ± 80 g/day; those with triplet foetuses ± 100 g/day. In the case of young ewes the respective mass increases is approximately 100; 110 and 140 g/day (NRC, 2007). Feeding levels for the respective groups of ewes can be adapted only after scanning, approximately 42 days after the rams have been removed.

It often happens that, owing to very good feeding conditions, the producer has little control over the pasture intake of mid-pregnant ewes which sometimes leads to the ewes becoming very and even excessively fat. It can be largely prevented by raising the carrying capacity. On scanning, ewes must be divided into groups (dry ewes; ewes with single foetuses; ewes with twin foetuses and ewes with triplet foetuses) so that differential feeding (feeding according to need) can be applied. Pregnant young ewes must however be kept and managed separately from pregnant adult ewes. To facilitate management, some of the respective groups can, on consideration, be joined together. With differential feeding, precision feeding can be applied. It is the most cost-effective and economic way to feed ewes. All dry ewes, including young ewes mated for the first time, must be culled on scanning. As an alternative, dry ewes can be moved to a cross-breeding flock, but on their first failure (not weaning a lamb) they must be culled forthwith.

If mid-pregnant ewes are unable to maintain their target mass increase on the available pasture, switch over to a suitable maintenance lick at the stage when the rams are removed. The type of lick depends on the type of pasture, as well as its quality and quantity. On abundant dry pasture one of the following maintenance licks (100 to 180 g/ewe/day) can be provided:

(1) Rumevite Ekonolek (V11147).

(2) 250 kg Voermol Winslek Concentrate (V17865) + 50 kg milled mealies, whole barley kernels or Voermol Molasses Meal (V1995) + 100 kg salt.

(3) Voermol Protein Block (V10448).

If dry pasture is scarce or if the recommended maintenance licks do not maintain the prescribed mass increases, particularly in the case of young ewes, one of the following production licks (250 to 350 g/ewe/day) can be provided:

(1) 700 kg Rumevite Ekonolek + 300 kg milled mealies or whole barley kernels.

(2) 400 kg Voermol Winslek Concentrate + 400 kg milled mealies or whole barley kernels + 150 kg salt.

(3) Voermol Energy Block (V11456) or Voermol Production Lick (V10108) or Voermol Maxiwool Production Pellets (V15415).

On green established pasture **Voermol Molovite** (V7266) at 200 g/ewe/day, and on green natural veld pasture **Voermol Supermol** (V7267) at 250 g/ewe/day, can be supplemented to maintain the prescribed mass increases. If the prescribed mass increases cannot be maintained with these licks on green pasture, it must be mixed half-and-half with milled mealies or whole barley kernels and fed at 400 and 500 g/ewe/day respectively.

6. Feeding during late pregnancy

Late pregnancy (fourth and fifth months of pregnancy) is one of the most important stages in the reproduction cycle of ewes as approximately 80% of the foetus growth takes place during this stage of pregnancy resulting in a significant increase in the feeding needs of the late-pregnant ewe (Bell, 1995; Dawson *et al.*, 1999). The fact that approximately 80% of lamb deaths are related to the feeding of the ewe during the last few weeks before and immediately after lambing, further emphasises the significance of adequate and correct feeding during late pregnancy (Seymour, 1998). If ewes are underfed even for one week during late pregnancy, good feeding afterwards can never fully compensate for it (Mellor & Matheson, 1979). Late-pregnant ewes with single foetuses must therefore take in adequate nutrition (i.e. flow-through protein, energy, minerals, trace elements and vitamins) from four weeks before lambing; those with twin foetuses from six weeks and those with triplet foetuses from eight weeks to stimulate udder development; raise colostrum and milk production; improve mothering traits of the ewes and vitality of lambs, as well as limiting birth problems (yellow lambs at birth) and limiting abnormally thick and sticky colostrum and to ensure an ideal birth mass (4.5 to 5.5 kg) that results in maximum lamb survival and that all these assist in limiting lamb deaths and/or increasing lamb growth. According to Robinson (1990), udder development depends directly on the amount of flow-through protein taken in. The supplement of flow-through protein on poor quality dry pasture increased the mass lamb weaned per ewe mated with up to 5.1 kg, as well as the subsequent lambing percentage by up to 28 percentage units (Brand, 1999). Adult ewes must increase at least 15% (i.e. 7.5 kg for a 50 kg ewe) and young ewes 10% in mass during the last two months of pregnancy to ensure a desired birth mass (3.5 – 5.5 kg) for high lamb survival.

The provision of a high flow-through protein lick (300 – 500 g/ewe/day) such as a Maxiwol lick mixture (250 kg **Voermol Maxiwol** + 200 kg milled mealies or whole barley kernels + 50 kg salt); **Maxiwol Production Pellets**; **Maxiwol Readymix** or **Maxiblock** before lambing is non-negotiable. If the pasture is scarce or where ewes must lamb in lambing camps or lambing enclosures, a complete wet ewe ration [375 kg milled lucerne (20 – 25 mm lengths) + 350 kg milled mealies or whole barley kernels + 150 kg **Voermol Maxiwol Concentrate** + 50 kg **Voermol Procon** + 80 kg **Voermol Molasses Meal**] must be fed from four or even six weeks before lambing. As this ration contains urea, the maximum intake must be limited to 2.5 kg/ewe/day to prevent urea poisoning. If higher levels must be fed, get in touch with Dr Jasper Coetzee for an alternative ration. Ewes must be adapted to this complete ration slowly and gradually to prevent acidosis. See that ewes have adequate feeding space (long-wool ewes: ± 45 – 50 cm/ewe; short-wool ewes: ± 40 – 45 cm/ewe) on the complete wet ewe ration. The peak and sustainability of milk production of ewes that are underfed during late pregnancy is lower than that of well-fed ewes. Ewes must also be injected with Multimin™ (G1853) as well as Vitamins A and E four to six weeks before lambing and be given the required dosings and vaccinations (multiclostridial).

7. Feeding during lactation

The feeding level during the first two months after lambing must be such that ewes do not lose more than 10% of their mass. Trials show that where the ewes lose greater mass, their subsequent lambing percentage was lower up to 25 and in one case up to 51 percentage units. It is admissible for ewes to lose condition in early lactation as long as the condition point is not below 2.0, but preferably not lower than 2.5. The objective must be that young ewes lambing for the first time do not lose more than 3% and adult ewes not more than 7% in mass during the first two months of lactation.

A limitation in feed intake can lower milk production by up to 50%. The growth of twin lambs is detrimentally affected if lactating ewes experience a feeding limitation for longer than 10 days. Milk

production of lactating ewes is disadvantaged by a feeding limitation of four weeks and no rise in milk production occurs even if *ad lib.* feeding is given after this period. The ideal is that, after lambing, ewes are moved to green established pasture or forage maize. To ensure a high wean mass as well as a high lambing percentage in the subsequent lambing season, the same flow-through protein-based lick or complete wet ewe ration must be fed as was fed during late pregnancy also during early lactation on the available pasture. After lambing the respective late pregnancy feeding levels of the Maxiwool licks are increased by ± 100 g/ewe/day while complete feeds are fed to ewes that wean single and twin lambs at approximately 3% and 4% of body mass respectively. Lactating ewes on forage maize or maize harvest residues with plenty of kernels must be fed a special lick mixture (150 kg **Voermol Landelek** plus 50 kg **Voermol Procon**) at 250 to 350 g/ewe/day. On standing soya **hewe** (unharvested soya beans) or on soya harvest residues with plenty of kernels **Voermol Molovite** (200 g/ewe/day) is recommended.

If ewes are not scanned, the suckle and dry technique is used to identify dry ewes as well as ewes that have lambled but that nurse no lamb at tail-cutting. All these ewes, including young ewes mated for the first time, must be culled. These ewes must be sold and the income used to purchase pregnant ewes, preferably those pregnant with twins. As an alternative, dry ewes can be moved to a cross-breeding flock, but on their first failure (not weaning a lamb) they must be culled forthwith.

8. Creep fodder for nursing lambs

Owing to the very effective feed conversion of young lambs, everything possible should be done to ensure that lambs grow according to their maximum genetic growth potential. The two main factors limiting the growth of so-called lambs on pasture, is the inability of the lamb's rumen to effectively utilise the pasture and the lamb's relative small rumen size when a pasture with a high moisture content is grazed (Joyce & Rattray, 1970). The provision of creep fodder for nursing lambs is non-negotiable for profitable sheep or goat production. Creep fodder prevents wean shock and it allows lambs to be weaned early already at 72 days of age at a minimum mass of 25 kg. Where lambs are weaned at 100 days, creep fodder will ensure that lambs' wean mass is at least 45%, but preferably 50% of their adult mass. Lambs receiving creep fodder can be 10 to 20% heavier at wean and marketed up to 50 days earlier, while a large percentage of lambs can be marketed directly from the ewes at three to four months of age. Nursing lambs marketed directly from the ewes have a very high slaughter percentage (> 50%). A wet ewe whose mother received good feeding from four weeks before lambing up to wean, as well as the wet lamb itself up to 14 weeks of age, but preferably up to sexual maturity, will ensure maximum development of the future reproduction potential of the wet lamb. Muscle cell increase in lambs occurs up to three months of age and muscle growth up to approximately nine months of age. Maximising both increases the carcass value of slaughter lambs and the eventual adult size of young rams and ewes that result in the latter case in increased lifetime production and reproduction.

A milled creep fodder mixture (150 kg **Voermol SS 200** + 175 kg **Voermol Procon** + 40 kg **Voermol Molasses Meal** + 625 kg milled mealies or whole barley kernels) or creep pellets (150 kg **Voermol SS 200** + 150 kg **Voermol Procon** + 600 kg milled mealies or whole barley kernels + 100 kg lucerne) can be fed *ad lib.* from two weeks of age to approximately two weeks after wean. See that there is adequate feeding space (± 2.5 to 5 cm/lamb). Lambs that receive creep fodder and are destined for the slaughter market, can be implanted with a suitable ear implant (e.g. Ralgro® of Zeraplix) at six weeks of age as it improves growth and feed conversion.

9. Feeding dry ewes

After wean, dry ewes must be given adequate opportunity to regain their mass that was lost since the previous mating season. To save on flush feeding, ewes must be divided according to condition into at least two groups (thin vs. good condition) at the stage when their lambs are weaned. The thin ewes must then be placed on better pasture to regain their condition so that they are in good condition (at least 3.0 CP) at the commencement of the flush feeding period. Depending on the condition of the ewes at wean, it appears that the best results are obtained in terms of lambing percentage if lambs are weaned at least three months before the next mating season. Trials in this regard show that it benefits

the conception of ewes (98% vs. 90% and 94% vs. 79%). It must be endeavoured to have dry ewes in a good condition (at least 3.0 CP) at the onset of the flush period. If the quality and quantity of the available pasture is such that this objective (i.e. 3.0 CP) is not feasible, a lick must be provided. The type of lick depends on the type of pasture, as well as its quality and quantity. One of the following production licks (250 to 350 g/ewe/day) may be considered:

(1) 700 kg Rumevite Ekonolek + 300 kg milled mealies or whole barley kernels.

(2) 400 kg Voermol Winslek Concentrate + 400 kg milled mealies or whole barley kernels + 150 kg salt.

(3) Voermol Energy Block (V11456) or Voermol Production Lick (V10108) or Voermol Maxiwool Production Pellets (V15415).

On green established pasture **Voermol Molovite** (V7266) at 200 g/ewe/day and on green natural veld pasture **Voermol Supermol** (V7267) at 250 g/ewe/day can be supplemented to maintain the prescribed mass increases. If the prescribed mass increases cannot be maintained with these licks on green pasture, it must be mixed half-and-half with milled mealies or whole barley kernels and fed at 400 and 500 g/ewe/day respectively.

10. Finishing off wean lambs on established pasture

Wean lambs destined for the slaughter market can be rounded off with the use of a special flow-through protein lick as well as by following specific management guidelines much more profitably on established pasture than in a feedlot. Apart from the lambs in this system maintaining the same growth rate as in a feedlot, they can be rounded off from up to 30 days and in some cases up to 60 days sooner than those that received no supplementary feeding on the pasture. This leads to more animals being rounded off on the pasture or that more pasture is available for the rest of the flock. Prerequisites for successful finishing off is well grown out (28 – 32 kg) and healthy lambs implanted with Ralgro® or Zeraplix and the provision of **Voermol Superlamb Pellets** on a dense stand, abundant actively growing, good quality, green leafy and tasty established pasture. **Voermol Superlamb Pellets** must be fed daily in troughs at 300 to 800 g/lamb/day. There should be adequate feeding space (\pm 25 – 30 cm/lamb) so that all lambs can feed simultaneously. The lambs must be given the required dosings and vaccinations (multiclostridial) before finishing off can commence.

11. Finishing off wean lambs in a feedlot

Diversification is generally accepted as a strategy for limiting the risk in agriculture. In this regard feedlot finishing off of own lambs should make up an integral part of sheep or goat farming to lower the risk. To realise the maximum profit in a feedlot, it is critically important to decrease the feeding costs per kg mass increase mainly by improving the feed conversion (kg feed taken in/kg mass increase). Feed conversion ratio (FCR) improves as the energy concentration of the ration increases because the feed intake drops while the growth rate (GDR) increases. Maximum generation of profit can however not occur by making the feedlot ration cheaper through using cheaper raw materials (e.g. low grade roughage and/or waste products) with a low energy density and feeding value as it would lead to a drastic decrease of feed conversion. On the other hand, the more expensive high quality raw materials become, the more important and critical the use of growth promoters such as feed supplements and growth stimulants become to improve the feed conversion and therefore maximise profit.

A high inclusion of flow-through protein sources (e.g. 10 to 15% **Voermol Procon**) in feedlot rations is highly recommended, because it improves FCR and promotes muscle growth which in turn raises the outcome percentage (Beerman *et al.*, 1986). As the flow-through protein intake increases, the FCR and the outcome percentage improve. The better the quality of the roughage, the higher the digestibility and the tastier it is, thereby ensuring a higher energy intake and a better FCR. As the quality of the lambs being rounded off also has a great effect on the feed conversion efficiency and growth rate and consequently the profitability of feedlot finishing off, only lambs that possess an excellent genetic feed

conversion potential must be rounded off. Prerequisites for maximum generation of profit in a feedlot are well grown out (28 – 32 kg) and healthy lambs that preferably received creep fodder; successful adaptation, as well as effective processing and excellent feedlot management and facilities. Furthermore, the provision (three times a day) of a high quality and balanced, highly tasty, energy-rich ration with the required buffers, ammonia salts, growth stimulants, flow-through protein, a series of minerals and vitamins to feedlot lambs are equally critical. An example of such a feedlot ration is: *125 kg milled lucerne hewe (25 mm) + 200 kg Voermol SS 200 + 100 kg Voermol Procon + 40 kg Voermol Molasses Meal + 550 kg milled mealies or whole barley kernels*. See that there is adequate feeding space (\pm 25 to 30 cm/lamb) so that all the lambs can feed simultaneously. Additional activities to be conducted are implantation of Ralgro® or Zeraplix; administering the necessary dosings and vaccinations (multiclostridial); injection of Multimin, Vitamins A and E as well as separating lambs into homogeneous groups.

12. Finishing off wean lambs on harvest residues or forage maize

The intake of vast amounts of grains lowers the digestibility and intake of dry harvest residues (e.g. maize leaves and grain stubble) and can also cause vesicular calculus, acidosis, poor animal performance and even deaths due to acidosis. Grains furthermore have a deficit of protein, particularly flow-through protein, as well as calcium, magnesium, zinc and copper that limit animal performance. Forage maize as well as small grain and maize harvest residues with plenty of grain kernels is particularly suited for finishing off wean lambs, but is also a valuable food source for lactating ewes and replacement animals. To limit deaths caused by acidosis and at the same time promote animal performance cost-effectively, **Voermol Landelek** must be supplied to sheep (150 – 200 g/head/day) on forage maize or harvest residues with plenty of grain kernels. Before animals are transferred to forage maize or harvest residues with plenty of grain kernels, they must first be gradually adapted to the grains and Landelek for approximately 14 days before being moved (refer to the Voermol Product Manual for correct adaptation procedures). Where lambs are rounded off on standing soya hewe (unharvested soya beans) or on soya harvest residues with plenty of kernels, **Voermol Molovite** (200 g/lamb/day) is recommended. Animals destined for the slaughter market must be implanted with Ralgro® or Zeraplix when finishing off commences.

13. Raising breeding rams

Breeding rams must be raised under conditions comparable to those under which they must produce and reproduce progeny. Most commercial sheep and goat producers prefer hardy and well-adapted rams and consequently young rams on the veld must be raised with no or minimal supplementary feeding. If the veld cannot maintain a growth of at least 90 g/day from wean to performance testing at 12 or 15 months of age, a low level (300 – 750 g/ram/day) of the ram flush mixture (*200 kg Voermol SS 200 + 150 kg Voermol Procon + 80 kg Voermol Molasses Meal + 575 kg milled mealies or whole barley kernels*) must be provided daily as supplementary feeding with adequate feeding space so that all the rams can feed simultaneously. If the feeding space is restricted or if rams cannot be fed daily, 100 kg of the grains in the mixture must be substituted with 100 kg salt. After performance testing the rams can be rounded off on the veld with the ram flush mixture (500 – 1 500 g/ram/day) or with a complete ram ration (*200 kg Voermol SS 200 + 50 kg Voermol Procon + 80 kg Voermol Molasses Meal + 425 kg milled mealies or whole barley kernels + 250 kg milled lucerne*) for the sales.

The selection of breeding rams must be very accurate because rams can contribute up to 75% of the genetic improvement of the flock. Breeding rams must be selected based on the economically significant breed characteristics as well as their BLUP breeding values. The BLUP breeding values provide the most accurate indication of the ram's predicted breeding value. If BLUP breeding values are unknown, breeding rams must be selected based on breed characteristics, but the focus must be especially on raising the flock's reproduction rate. Preference must therefore be given to rams born from mothers that weaned more lambs as the number of times they had lambing opportunities; multiple born rams and rams with firm and elastic testes with a testicle circumference of more than 35 cm at 15 months (i.e.

for rams in a good condition), as well as rams with a very high libido. Rams with a high libido usually have a very alert and vital posture; clear and lively eyes; an aggressive nature and purple groins.

14. Conclusion

Effective supplementary feeding practices form an integral part of efficient management and breeding practices. These practices must not be seen in isolation from one another, but as a unit; together they form the base of profitable sheep or goat farming. The strategic supplementation of the proper nutrition (especially flow-through protein and energy; minerals; trace elements and vitamins) in the right quantity and combinations to grazing animals is of critical importance to ensure maximum and cost-effective response. At the same time a very high level of management must be maintained while management practices must be continuously adapted. In this regard it is absolutely essential that an effective and scientifically based management, disease preventative and health control programme be meticulously followed and continuously adapted as new information and technology become available. To ensure a highly productive sheep and goat flock, genetically superior breeding animals (ideally to only use proven superior breeding rams that are genetically better than your flock) must be selected, while unproductive animals (e.g. those that do not lamb or do not wean a lamb) must be continuously and immediately culled.

To generate maximum profit, the producer must get his priorities right and focus on those aspects (e.g. reproduction rate) that generate the most profit. To earn a high price and a price premium for their marketable product, producers are compelled to produce a quality product as well as what the market and consumers demand and they can no longer produce any quantity of any quality and when they feel like it. Producers are strongly recommended to visit very successful producers (e.g. winners of the Sheep Farmer of the Year competition) and learn from them what they do to be highly successful. These producers always have new ideas and better ways of doing things. Producers are further advised to use the latest technology, because, according to Prof Johan Willemsse (2001), producers will have great difficulty to increase their income versus their expenses without using new technology and management methods. In this regard Australian consultants agree that the willingness of a producer to use new technology and management practices in his flock greatly determines his profitability. Producers are requested to consult the experts in this regard to become informed of the latest technology and the most profitable production system(s) for his specific farming operation.