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# MINERAL REQUIREMENTS AND IMPACT ON DAIRY AND MEAT GOAT PRODUCTION

A healthy goat needs 15 essential minerals, 7 macrominerals, and 8 trace or microminerals. A balanced, loose, free-choice goat mineral is important for goat health. Using a salt block or a block of common livestock minerals is not ideal for goat health. A goat might need only ¼ to ½ ounce per day of a well-balanced mineral. On the other hand, it would need to consume 2 to 3 ounces per day of a salt block with trace minerals.

Minerals and vitamins are important components of dairy goat nutrition, and their requirements can be affected by the physiological growth state of the goat (growth, pregnancy, and lactation).

Macrominerals are usually reported on the feed tag on a percentage basis (%) and microminerals as parts per million (ppm), milligrams per kilogram (mg/kg), or grams per ton (g/ton). The main macrominerals needed in a goat's diet are calcium, phosphorus, magnesium, sodium, potassium, sulfur, and chloride. The microminerals usually supplemented in goat rations are iron, copper, cobalt, manganese, zinc, iodine, selenium, molybdenum, and others.

Feeds are natural sources of minerals. Forages, depending on the soil pH and fertility, can be good sources of **potassium** and **iron** and are low in **sodium**. Cereals (concentrates or grains) are high in **phosphorus** and low in **calcium** and **sodium**. Legume seeds are richer in all minerals than forages and cereals.

Feeding calcium and phosphorus at a 2:1 ratio is recommended for better structural and bone strength, while other minerals are necessary for other systems like the nervous and reproductive systems.

Mineral deficiencies in dairy goats can have detrimental health effects. **Calcium** deficiency in dairy goats can lead to reduced milk production and cause parturient paresis (milk fever). **Phosphorus** deficiency can result in slow growth, an unthrifty appearance, and occasionally a depraved appetite. The calcium to phosphorus ratio should be maintained between 1:1 and 2:1 to avoid predisposition for urinary calculi.

**Magnesium** deficiency is associated with hypomagnesemia tetany (grass tetany). This condition is less common in goats than in cattle. Goats can compensate for magnesium deficiency by reducing the amount of magnesium they excrete (urinary and milk production).

**Potassium** deficiency is extremely rare in adult dairy goats because forages are usually rich in potassium. Deficiencies are usually observed when lactating does are fed a diet high in cereal grains. Potassium-rich diets could cause hypocalcemia in the herd.

**Iron** deficiency is seldom seen in mature grazing goats but could be observed in young kids due to low iron content in the milk. Iron deficiency can also be observed in animals that are heavily parasitized and is a sign of anemia.

**lodine** deficiency in the soil can impact the amount in forages. Iodine deficiency results in an enlarged thyroid, poor growth, small and weak kids at birth, and poor reproductive ability.

**Zinc** deficiency results in parakeratosis, stiffness of joints, smaller testicles, and lowered libido. Excessive dietary calcium may increase the likelihood of zinc deficiency.

Copper deficiency may result in microcytic anemia, poor production, lighter or faded hair color, infertility, miscarriage, poor health, slowed growth, some forms of metabolic bone disease, diarrhea, and possibly a greater susceptibility to internal parasites. A low copper to molybdenum ratio or excessive dietary sulfur can cause a copper deficiency.

**Selenium** deficiency is associated with nutritional muscular dystrophy, retained placenta and metritis, poor growth, weak or premature kids, and mastitis. On the other hand, **cobalt** is known to aid in the production of red blood cells and improve fertility. Both copper and cobalt boluses are available for goats as a ruminal slow-release form of these microminerals; copper is used for parasite control and cobalt for reproduction.

Providing a free-choice mineral is recommended because forages might not have the concentrations required by goats at different growth stages. Soil quality and pH can affect the availability of macro- and microminerals absorbed by forages or browsing species. It is important to choose a loose mineral that is balanced. Goats have soft tongues, which makes it difficult to get enough minerals from a block or a bucket, while loose minerals can be easily licked up.

## **Augusta Co-op Solution**

## Purina, Goat Mineral, 25 lbs.

A free-choice mineral supplement rich in nutrients essential to the proper development and well-being of goats of all ages and breeds. A coarse particle for less waste and less dust. Contains added copper, zinc, vitamins and other minerals.



SKU - 53551

Salt (NaCl) is a necessary dietary component, and it is used as a carrier for trace minerals because goats have a clear drive for sodium intake. Salt blocks might not provide the required levels to maintain goat mineral requirements. They are designed to provide 25 to 50 percent of nutrient requirements.

TESTING!

It is important to determine which minerals your herd needs and design a forage-testing program that determines the nutritive value of the hay or forage being grazed.

Loose minerals should not require additives (molasses, pelleted feed, etc.) or salt because they are salt-balanced to regulate intake. Providing additives with a loose mineral can dilute the mineral and vitamins and result in economic losses. On the other hand, salt blocks with trace minerals might increase water consumption because of their high salt content and might not be balanced to meet goat mineral requirements. Tubs are flavored with molasses and a combination of protein and minerals. These can alter daily consumption of the required supplementation and lead to possible overconsumption and toxicity.

To meet the mineral requirements of goats at different growth stages, select mineral products that provide a well-balanced mineral profile, reduce mineral losses during feeding, and are economically justifiable.

The ratio of calcium to phosphorus is an important factor because an imbalance of these two mineral concentrations can result in lower mineral bioavailability and other possible health issues. To reduce mineral losses, place mineral feeders under roofed areas and high enough to avoid fecal or dirt contamination. Place feeders in a dry area to avoid water accumulation. Provide several feeders so the whole herd has equal access to minerals. Monitor mineral feeders at least once a week and refill them as necessary.

Having inconsistent access to minerals will result in deficiencies and poor performance. Balanced supplementation with macro- and microminerals will reduce herd diseases, including parasitism and hoof problems, two of the main health issues goats face.

#### **VITAMINS**

Fat-soluble vitamins A, E, D, and K are necessary for many functions within the animal and for the maintenance of herd health. Quantities are expressed as international units (IU, a unit used to measure the activity of vitamins, hormones, enzymes, and drugs).

Vitamins A and E have specific dietary requirements, whereas vitamin K can be synthesized in the rumen, and vitamin D can be synthesized by the skin when exposed to adequate sunlight. Vitamin A is needed for normal growth, reproduction, and maintenance of healthy epithelial tissue. Vitamin D is needed to build a strong, healthy skeletal frame. Vitamin E is an antioxidant that helps counteract harmful free radicals produced within the body. Vitamin E also helps maintain cell membrane and tissue integrity, also necessary for proper immune system function. A goat with a balanced ruminal microbiota can synthesize vitamin B in sufficient quantities to support metabolism. Vitamin C is synthesized in the liver, and it is essential for the goat's immune system to work efficiently and protect them from diseases.

Mississippi State Extension

## SHEEP NUTRITION IS KEY TO LESS MASTITIS IN EWES

## PROPER SHEEP NUTRITION DURING DRY OFF CAN REDUCE MASTITIS AND IMPROVE LONGEVITY FOR EWES.

Lambs get 100% of their nutrition from ewes' milk during the first eight weeks of life, so it's vital to maintain udder health. On top of that, weaning occurs shortly after peak milk production for the ewe – making the risk for mastitis in ewes high. An easy way to proactively manage udder health and mastitis is through nutrition.

Managing mastitis via nutrition and management are simple ways to keep mastitis in check and ewes and lambs thriving through weaning and beyond. Heading off mastitis can help reduce long-term udder quality issues and maintain future milk production – and keep ewes in the flock longer.

Follow these tips to reduce the risk of mastitis and maintain ewe and lamb health:

#### SLOW DOWN MILK SUPPLY

One of the best ways to avoid mastitis in ewes is by gradually slowing down milk production leading up to weaning.

There's a higher risk of mastitis, hard bag and other issues if milk production is still high at weaning. The goal is to reduce energy in the diet and slow down milk production before removing lambs.

At peak production, typically 5-8 weeks after lambing, ewes are commonly fed a high-energy, corn-based ration and high-quality hay to maximize milk production and lamb growth. At the eight-week mark, while lambs are still on the ewes, start a

10-14 day dry-off period. During this timeframe, gradually remove grain and switch to grass hay to lower energy levels in the diet and reduce milk production while keeping ewes full.

Reduce water availability for ewes 24-hours after weaning to further decrease milk production, but don't eliminate water access, especially during warm weather.

#### LET EWES LEAD THE WAY

One of the biggest mistakes made with mastitis management is weaning lambs too early – before milk production has sufficiently decreased.

If ewes are still producing high volumes of milk at eight weeks post lambing, even after changing to a low-energy diet, wait to remove lambs. Watch ewes closely to monitor milk production and wait to wean until milk production has slowed to protect udder health and limit mastitis risk.

Operations with ewes and lambs on pasture throughout lactation typically see ewes wean lambs around six months old. Mastitis isn't common because ewes gradually dry up themselves.

#### PREPARE EWES FOR THE NEXT PHASE

With so much excitement around weaning, it's easy to get caught up in the moment and not look ahead to the next phase of life for the ewe. But, it's a phase to monitor and manage closely – especially with breeding season on the horizon.

Ewes coming into lambing with an acceptable level of body condition – a body condition score 3 on a 5-point scale – are in a better position to rebound quickly after weaning. But don't wait until flushing begins to start getting ewes back in the correct body condition.

Start feeding Purina® Wind and Rain® Sheep Mineral designed for consistent intake once ewes are dry and moved out to pasture – no more than two weeks after weaning. Adding a mineral to the diet helps get ewes back in shape quickly so they're ready for breeding season.

Mineral alone won't get them back into shape prior to breeding season. To keep ewes in a body condition score 3, feed Purina® Accuration® Sheep & Goat Hi-Fat Block along with Wind and Rain® Sheep Mineral after weaning.

Drying up ewes with a proper nutrition and management strategy can increase their longevity in the flock.

Purina

## **Augusta Co-op Solution**

### Purina Wind & Rain Sheep Mineral

Purina® Wind and Rain®
Sheep Mineral is formulated
with our patented and proven
Wind and Rain® technology
to help reduce clumping,
therefore reducing waste
while saving you time and
money. Now contains Availa®
zinc and manganese to
support hoof health and
reproductive efficiency.



SKU - 3003807

## MANAGING PARASITES WITH GOOD NUTRITION

We all know that if we eat better, we feel better. For many years, we have also known that protein nutrition can affect a sheep's resilience to gastrointestinal parasites and it can also reduce the consequences of parasite infections. Therefore, as sheep producers it is important to pay close attention to what our sheep are eating.

To better understand how nutrition can affect parasitism, we need to take a closer look at what happens within growing animals and reproducing animals. One of the first signs that we see is the reduction in feed intake. Research by Sykes et. Al., 1988 and Coop et al., 1982 found that feed intake is often reduced by as much as 15 to 20%. Another problem that is occurring internally is the loss of protein and tissue damage within the digestive tract. This relates to decreased efficiency in the utilization of feeds. Both of these cause production losses through decreased growth, decreased milk production and to some extent decreased reproductive efficiency.

Numerous research studies have looked at how to improve production and growth without the use of anthelmintic (dewormer) treatments. These studies found that increasing the metabolizable protein in the diet during times of protein scarcity enables sheep to become more resilient to parasite infections and may also contribute to developing immunity to infections. Research looked at a number of different protein supplements including soybean meal, fish meal, cottonseed meal, urea and dried distillers grains with solubles (DDGS). Many of these studies have also found a reduction in fecal egg counts over a long term period when dietary protein levels were increased.

As animals react to parasite infections and the scarcity of nutrients, they tend to allocate how they will use their feedstuffs. Coop and Kyriazakis, 1999, state a possible ordering of priorities to the animals. Young, growing animals will tend to focus on maintaining body protein, then acquiring immunity to parasites, followed by protein gain and then maintaining body lipids or

body condition. For reproducing animals, they state that maintenance of body protein is the priority followed by pregnancy or lactation, then expression of immunity and body condition.

So, how can we as sheep producers use this information for our flocks? Certainly, looking at nutrition and protein in particular can be useful in an integrated approach to internal parasite management. Protein supplementation during times of the year when sheep consume lower quality feed would certainly help sheep to better manage parasites. Increasing metabolizable protein by as much as 20 to 25% was indicated in research by Datta et. al., 1998, Donaldson et. al., 2001 and Houdijk et. al., 2003.

The benefits of increasing protein levels are especially seen with ewes rearing multiple lambs when they are in relatively poor body condition and with young growing lambs that have the genetic potential for fast growth. Further research is needed to determine the best protocol for protein supplementation to develop immunity and resilience to gastrointestinal parasites. For now, producers should monitor protein levels in rations throughout the year to ensure that feeds are meeting the national resource council's recommendations.

## **Augusta Co-op Solution**

# Co-Op, 28% Sheep & Goat Block, 25 lbs.

A high protein supplement block for sheep and goats older than 60 days of age that are maintained on pasture. Adds protein and energy to the diet. Provide one block per 20 head of animals along with adequate pasture or hay.





**SKU - 624** 

Penn State Extension

## **BUCK SELECTION PRINCIPLES FOR MEAT GOATS**

Improving genetics within a herd starts with selecting a quality buck that complements existing doe traits and improves any weaknesses in the herd. Buck selection principles should consider a number of different aspects, including performance, visual appraisal and cost.

When selecting a buck, producers should begin by analyzing what production traits the does in the herd exhibit as strengths. Then, producers should analyze what traits would be considered weaknesses. Doe **estimated breeding values** (EBVs) or production records from the past couple years can be used to assess these strengths and weaknesses. Finally, rank the traits that a buck should possess to best fit the operation's goals. These traits can be classified into categories such as growth traits, carcass traits, or maternal traits. Growth traits include weaning and post weaning weights, while carcass traits include loin depth (or size) and fat thickness. Maternal traits often include number kids born and number kids weaned and may include scrotal circumference of the bucks, because bucks with larger scrotal size tend to sire does with improved reproductive performance. Another category to consider, depending on operation needs, would be parasite resistance. These EBV traits are available for meat goat producers who enroll their herd in the National Sheep Improvement Program.

Once the top traits desired in the new buck have been identified, then the selection process can begin. Single trait selection often results in decreased desirability of other important traits. Therefore, always consider several traits in order to select a buck that will move the herd toward more optimum genetics.

#### SELECTION USING PERFORMANCE DATA

One of the best ways to compare individual goats is by using data. Producers collect these data starting when kids are born and add information throughout a doe's or buck's life.

When selecting bucks based on data, there are two options: EBVs and individual performance within a herd. EBVs are the preferred selection parameter because these numbers focus on genetic estimates for performance across a breed. EBVs are measurements of heritable traits such as number of kids born, weaning and post weaning weights, and carcass traits. While an individual's performance within a herd is still useful information the performance of that individual will be influenced by management and environmental factors in addition to genetics.

The National Sheep Improvement Program (NSIP) uses data collected on a farm and makes genetic connections to other herds through a database in Australia known as LambPlan. This database uses a record keeping software called Pedigree Master to submit data for NSIP. Participating in the EBV program helps producers improve genetic predictability in order to produce a more consistent product, which could be breeding stock or meat for customers.

In addition, records allow producers to make informed decisions for both selecting replacement animals and for culling poor performing animals. This is especially important for identifying animals within the herd that do not produce offspring that meet minimum production standards. Producers can also utilize records on progeny to make culling decisions once does and bucks produce offspring. Performance data collected on individual goats can be interpreted at the farm level or can be sent to NSIP to develop EBVs.

#### COMMON PERFORMANCE DATA INCLUDES THE FOLLOWING ITEMS

Birth weight: Most kids should weigh between 5 and 8 pounds at birth, depending on the mature size of their parents.

Larger kids may cause kidding difficulties, while smaller kids may require producer assistance for the first few days after birth. This adds to the labor requirements at kidding and can increase the likelihood of death losses.

**Birth date:** To best manage groups of does and kids, does in the herd should give birth as close to the same date as possible. A good goal is for all kids within the herd to be born within two heat cycles, or 42 days. Kids born outside this 42-day window often weigh less than the average at weaning. Producers should consider culling does that do not kid within this timeframe.

**Birth type and rearing type:** Birth type refers to kids born as a single, twin or triplet. To be profitable, many operations need their does to produce twins and does should rear those kids as twins. Yearling does are the exception, as most will produce a single kid. Selecting bucks, as well as does, born as twins can help to boost the genetic likelihood of twinning. But nutrition also plays a large part in twinning rates.

**Weaning weight:** Many kids in the northeast are sold at weaning, so heavier weaning weights can increase the profitability of an operation. A good goal is to have meat goat kids weigh 35 to 50 pounds or more by 60 days of age. However, this is not a realistic goal for all breeds.

Kids born as singles normally weigh more at weaning than kids born as twins or triplets. Other factors, such as the sex of the kid and the age at weaning, also influence the weaning weight. Keep in mind that a pair of twins will most likely weigh more at weaning than the single kid. Thus, the weight of the pair, even if its individuals weigh less than the single born kids, determine the income produced by the doe.

#### **ADJUSTING WEANING WEIGHTS**

As alluded to earlier, animal performance is based both on genetics and the environment. Producers can adjust weaning weights in order to compare individual kids born on the same farm, since these animals have theoretically all been exposed to the same environmental conditions.

Weaning weights can be adjusted for:

- age at weaning
- birth type (single, twin, or triplet)
- rearing type (single, twin, or triplet)
- sex of the kid
- age of the dam or mother

To adjust for the age at weaning:

- 1. Determine an age to adjust to. Weaning weights are typically adjusted to 90 days of age but could also be adjusted to other ages such as 60 or 120 days of age.
- 2. Subtract the birth weight from the weaning weight. This is the weight gained.
- 3. Divide by the age of the kid (in days) when it was weighed. This is the average daily gain.
- 4. Multiply the average daily gain by the weaning age you are adjusting to (usually 90 days).
- 5. Add the birth weight.

Estimated 90-day weight = (((weaning weight – birth weight)/age at weaning)  $\times$  90) + birth weight.

The estimated 90-day weight can then be adjusted for more factors. The following table lists adjustment factors to account for the age of the doe, sex of the kid, birth type, and rearing type.

#### SELECTION USING VISUAL APPRAISAL

In addition to using individual performance and EBVs, anyone involved in goat production should have the skills to evaluate the physical characteristics of individual bucks for their potential as breeding stock. Producers should be able to visually evaluate goat structure and they should also be able to evaluate muscling.

In order for a buck to be sound on his feet and legs, he must be structurally correct. Correct structure enables the buck to move properly and proper movement allows bucks to comfortably mount does during breeding.

To be able to evaluate or select structurally correct bucks, producers must first have an understanding of the parts of a goat as well as each part's correct structure. Remember, selection should begin with a look at performance records followed by visual evaluation. Visual appraisal can be a good indicator of frame size, muscling, body structure, feet and leg structure, and breed character.

Correct skeletal structure is important and essential for any animal to move to feed and water. This structure can be observed in shoulder angle, pastern angle, and levelness of the hips and top line from neck to rump. The angle of the shoulder should be approximately 45 degrees, while the pastern angle should be approximately 50 to 55 degrees or slightly more. Skeletal angles in the shoulders, hips, and legs are all important for ease of movement. When angles are within appropriate ranges, the animal is generally level across their topline and able to move freely.

When making visual selection decisions for correct structure, it is important to know all the external parts of a goat. Each part has an ideal characteristic for breeding bucks.

#### **BUCK COST CONSIDERATIONS**

The final consideration in buck selection, but often the starting point for many producers, is the price. How much can the operation afford to pay for a buck? This not only depends on a bank account but should also depend on the value of that buck to the operation. So, how does the operation determine what is appropriate?

Purchasing a new buck should always require careful consideration in all areas, including cost. All producers want to find a bargain: the highest quality genetics for a bargain price. However, progressive producers should spend some time developing a selection strategy and setting up a budget to determine what a buck is worth to the operation. Consider the buck an investment and think about what value that buck will bring to the operation.

When looking at a buck as an investment, an item to consider would be how he can be expected to impact improved production. How will his kids compare to previous kids born on the operation? Will they have heavier weaning weights? Will they be more acceptable to buyers? What traits will his daughters exhibit to improve performance? These are all considerations that not only impact the bottom line the first year after this buck produces kids, but into the future as daughters are retained in the herd.

When considering the cost of a new buck, begin by estimating the salvage value of the buck once the operation has finished using him. If the operation has a market for aged bucks, how much should the operation charge? If selling aged bucks are there any health tests that should be performed to ensure the buyer that the buck won't share any diseases with the new herd? Subtract those costs to arrive at a salvage value. If the buck sells through a sale barn, what is the likely value for cull bucks? Or will the salvage value be zero because the buck can be expected to live the rest of his life at this operation?

Consider an example of a producer paying \$1,500 for a buck that will be used for 2 years to service 35 does each year. After the producer finishes using this buck, he intends to sell him through a sale barn for about \$300. This makes the difference between the purchase price and the salvage value \$1,200. By dividing the salvage value by the 2 years the producer plans to use the buck, the depreciation cost amounts to \$600 annually. Divide the annual depreciation cost of \$600 by the number of does serviced to determine the depreciation per doe, which would be \$17.14 for this example.

An operation must know the cost of production to determine if this is acceptable. What does it cost the operation to keep a doe per year? If \$17.14 is added to a doe's annual costs, how will this impact the operation's profitability? Should this cost be considered an investment for the future when this buck's daughters enter the herd?

Another way to look at the salvage value of the buck is to consider how many kids per year must be sold to cover the depreciation cost. For example, an operation sells 60 lb. kids for \$250. Subtract sales and transportation costs. For this example, \$225 is the value that a kid brings to the operation. Therefore, \$600 divided by \$225/kid means that it takes about 2.7 kids each year to cover the cost of the buck.

Producers should always purchase the best buck that they can afford. A buck has the potential to impact a herd for many years through his daughters. So, spend some time determining what traits a buck should possess to improve the operation, what value a buck will have to the operation, and then decide on a fair price.

#### SUMMARY

Every meat goat operation should spend time developing a buck selection strategy. Analyzing the doe herd will help to determine what traits would be important in a buck. Producers should also consider performance data, either in the form of EBVs or adjusted weaning weights, in addition to visually appraising the buck. Be willing to pay a fair price for a good buck. Developing a good strategy will yield bucks that produce kids that perform well and future daughters that improve genetics within the herd while maintaining operation profitability.











#### EVENTS / CALENDAR

## FRIENDS & FAMILY SALE (AFTER HOURS)

#### Thursday, November 7 • 5:30PM-8PM

40% off all boots & clothing. Plus deals throughout the store - pet, Milwaukee, YETI, Wild Bird Seed & more! Staunton location only.

Members only event.

#### **BLACK FRIDAY SALE**

#### November 8-9, 2024

40% off all boots & clothing. Open to the public. Staunton location only.

#### **DEALS LEADING UP TO CHRISTMAS**

November 11-16

35% Off Ariat & Carhartt



Scan to view event details

#### November 12-16

BOGO 50% Off Exclusive Dog & Cat Food

#### November 18-23

35% off Wrangler & Cinch / \$40 off \$250 Small Engine purchase or service.

#### November 25-30

30% off Boots & Accessories

#### December 2-7

30% off Toys & Giftware

30% off Simply Southern & Sterling Kreek Clothing

#### December 14

Free bucket plus 30% off whatever fits inside! LTO – first 150 buckets. Deals complete after buckets distributed. Exclusions apply.