

Restoring and Maintaining Health By Alethea Kenney

The first thing that catches most people's eye when they look at a flock of Icelandic sheep is the beauty. The sheep are so majestic with their long flowing locks, gentle eyes and lovely natural colors. That beauty is more than just skin deep, it starts with proper digestion, nutrition and pasture management. Without those things, sheep quickly become ragged, unthrifty, with low fecundity, difficult lambing, poor milk production and weight loss/poor gain. Parasites move in and invite all their friends. All of these problems contrive to make the life of the shepherd a nightmare of management chores. Many shepherds assume these issues are part of raising sheep, just par for the course and something that must be dealt with. Fortunately, that is not the case. Issues like poor wool quality, hoof conditions, low lambing percentages and difficult births, poor weight gain and milk production, diseases and parasites are all related very closely to health of the animal and underlying nutritional issues. I would like to give a brief explanation of the importance of minerals in restoring and maintaining health in sheep and ways to get those minerals into the sheep in a bioavailable, easily digested form.

Mineral Primer:

Since sheep and goats are herbivores, their nutritional needs are met mostly with hay and forage. Like all living things, they also need minerals, the building blocks of the body. They can take in much of their mineral needs from their feed although almost every shepherd offers some type of mineral supplement to their animals. In an ideal world, soils would provide most of the mineral needs for the flock through the pasture and hay, but many factors come into play in mineral availability in soils. Many farms have soils deficient in several key minerals, have applications of chemical fertilizers that cause trace minerals to be unavailable for use by plants (and therefore grazing animals) or have excessive pH causing some minerals to become less available. Weather may cause plants to either uptake more of or less of certain key minerals.

Problems in health can occur when the mineral supplements do not contain enough of a particular needed mineral, contain it in a form that is not particularly available to the body for digestion and absorption, or don't contain the needed mineral at all. On some farms, excesses of certain minerals in soils, water or feed may throw off the balance of related minerals or cause elimination of other trace minerals. Supplemental mineral mixes may not contain enough of the needed mineral to offset those local conditions.

Minerals are generally divided into trace (or micro) and macro minerals. Trace minerals are those that are needed in very small amounts, but this is not to say they are not critical to health. They may be the limiting factor in life or death! Macro minerals like calcium, magnesium and phosphorus are needed in large amounts. They are also critical to health and life; without the proper amounts of these minerals in proper balance with each other, sheep will eventually die. Thankfully, many mineral imbalances do not cause death, at least not immediately. Low level deficiencies often lead to the above-mentioned problems and contribute to loss of production in a flock. Those types of deficiencies cost a shepherd a lot of time and money.

Increasing Needs:

Situations that produce stress in a flock or herd can change mineral needs and upset rumen balance. Stress increases need for minerals like selenium (and related vitamin E), magnesium and copper. Heat and humidity, travel, illness and parasites can all increase mineral needs (and may show mineral deficiencies and imbalances). Tetany from travel (stress), grass low in magnesium or lactation are symptoms of low magnesium, for instance. And white muscle disease that may occur in heat-stressed adults or show up as weak lambs and retained placentas at birth is a selenium deficiency. Most mineral mixes cannot compensate for these situations and shepherds need to be prepared to change their supplement strategies depending on weather, time of year and increases in stress.

Pregnancy and lactation increase need for minerals. If a ewe or doe is not getting what she needs for proper reproductive health before breeding, she will not produce as many lambs or kids (or may not cycle at all) and rams may produce inferior sperm. Weight loss is an issue and is related not only to mineral intake but to quality of feed. Once a ewe is bred, she needs enough minerals in proper ratio to meet not only her maintenance levels but to grow lambs and prepare for birth and lactation. Her needs increase as the fetuses grow and after lambing, need for some macro minerals (like calcium and magnesium) increase tremendously to meet the demands of lactation.

Lambs born deficient in some minerals may not thrive and may even die before reaching maturity. Selenium and copper deficiency can lead to weak lambs and kids (for different reasons: low selenium is associated with white muscle disease and weakness, while low copper is associated with poor nerve function and "swayback disease"). If young survive (usually after much intervention from the shepherd), they may grow poorly and can even die spontaneously from things like copper deficiency. Selenium also relates closely to immune function and fertility and acts as an antioxidant (important in protecting red blood cells) so is important during more than just lambing. Copper is important throughout life for immune health, ability of the body to use iron (and therefore make hemoglobin in the blood), wool production, bone growth and reproductive health.

Parasites:

Many shepherds consider parasites part of raising sheep and goats and attack them as the enemy. While parasites can certainly be detrimental (and in some cases, deadly), it is not reasonable to try and eliminate all parasites. Healthy animals will not maintain high levels of parasites, making the shepherd's job much easier. Restoring and maintaining health is paramount to dealing with parasites, and minerals play a huge roll.

Copper is one of the first minerals to be considered when talking about parasites because of its use as copper oxide wire particles (COWP) to kill some parasites. However, copper is needed for much more than just killing parasites in the rumen and the copper oxide is not a particularly well-absorbed form. It is likely that flocks needing the COWP have other underlying mineral imbalances contributing to higher parasite levels.

Selenium's role in immune health translates to importance in building up immunity to parasites and recovering from parasite infections.

Studies done on cobalt show that lambs getting adequate cobalt had lower levels of parasites and better weight gain than those lambs getting no cobalt but regular dewormings. These three are not the only minerals important to health but their lack can definitely increase susceptibility to parasite damage.

Disadvantage of Mineral Blocks:

Sheep and goats have different needs than other herbivores and humans even though all mammals require essentially the same minerals for proper health. Because sheep don't have upper front teeth, they don't make good use of mineral blocks. Mineral blocks also have the disadvantage of containing salt. Since sheep self limit salt intake, this keeps sheep from overeating the block but it also means they will not make good use of mineral or trace mineral blocks if they have severe deficiencies.

Mineral in blocks is also not in a very absorbable form. Blocks often contain the elemental forms of minerals that are not as easily digested. Mineral blocks and loose supplements contain high levels of salt and also contain flavor enhancing additives and preservatives. The flavor enhancers ensure sheep eat the mineral, but they don't contain needed nutrients and can often be detrimental. Things like molasses add sweetness and may increase susceptibility of the sheep to internal and external parasites and insects and disrupt proper rumen function.

Availability:

The form minerals are in is important. Elemental forms of minerals are not as easy for mammals to digest in many cases. Soil bacteria and fungi assist plants in taking the elemental minerals and changing the form to something useful for growth and much more digestible for sheep or goats. Mineral supplement manufacturers make use of this knowledge to create minerals that are bound to amino acids and therefore more available for digestion and absorption. These minerals are called chelated. Chelated minerals have several advantages such as better availability for digestion and palatability. Because chelated minerals are so easily digested (sometimes close to 100% useable by the body), they can help offset situations where other minerals cause elimination or poor absorption of the needed mineral. This interplay occurs for all minerals and is a problem when one mineral becomes completely unavailable due to the extreme excess of another antagonistic mineral. Examples are molybdenum completely inhibiting copper or iron interfering with selenium. Other mineral interactions become a problem if minerals are out of balance with one another. Excess salt will deplete potassium (or the reverse) and excess calcium not only causes elimination of trace minerals, it throws off the balance with magnesium and phosphorus. Several of the more common trace minerals (and some macro minerals) are now available in a chelated form for supplementation, making it easier to get a proper amount of those minerals into an animal.

The Importance of Natural:

I am always surprised to hear from shepherds who spend a lot of time giving injections, particularly when those injections are to try and meet mineral needs (or compensate for deficiency that leads to vitamin deficiencies). BoSe, Bovine Selenium injectable is used to treat selenium deficiency in pregnant animals (although this is extra label), prevent white muscle disease/weakness in newborns and treat low level signs of white muscle disease in adults. From my point of view, injecting minerals to compensate for the lack of available minerals in a supplement (or soils and forage) is not the best way to tackle the problem. Not only is this an unnatural way to get a mineral into an animal, it is costly, time consuming and can have side effects, in the extreme case death from anaphylactic shock. A better way to meet selenium needs would be to use a chelated product like Selplex (made by Alltech). Products like this have the advantage of crossing through the placenta, meaning lambs are born strong and running, crossing into milk, meaning lambs continue to get selenium from their mother after birth and being bioavailable, meaning it is easily digested and there is no interference with antagonistic minerals. Prevention really is worth a pound of cure when working with minerals.

In addition to chelated mineral products, things like kelp contain needed minerals (both trace and macro) in an easily digested form that is palatable. Herbs, brush and trees can be used to provide minerals in individual cases and as part of a grazing program. Since tree roots reach deep into the subsoil and bring up trace minerals otherwise not available in the pasture, sheep or goats may eat bark to try and meet trace mineral needs otherwise lacking in the supplementation program.

Improving soil health by reducing use of chemicals that can kill off beneficial bacteria, fungi and insects improves availability of minerals and nutrient content of forage. Restoring minerals through applications of compost and fertilizers (preferably not the conventional) also improve mineral availability.

It is important to remember that everything needs to work together for animals to be healthy and one of the first steps is proper digestion. Without this, sheep and goats cannot make use of any other nutrient taken in. All minerals interact with one another, in soils, in plants and in the body. While minerals are discussed separately, in reality, they cannot be so easily divided.

Digestion:

No matter how much quality feed is provided, if an animal is unable to digest it, the nutrients are worthless. Herbivores, and ruminants in particular, have very elaborate digestive systems, designed to take plant material and use it to meet the nutritional needs of the animal. Ruminants can make use of roughage completely indigestible to other mammals, as long as their rumens are fully functional. Minerals play a huge role in maintaining the health of the bacteria in the rumen that are the basis for digestion and assimilation of nutrients.

Cobalt is a mineral I consider the base of the pyramid. Although it is a trace mineral, it is vital to the rumen bacteria health and ability to assimilate nutrients. It is also used to make vitamin B 12 (cobalamin) and is important in folate metabolism. Lack of cobalt results in rumen bacteria dying, associated lack of appetite and weight loss (referred to as chronic wasting disease). Other symptoms include coldness, poor wool production/loss and pernicious anemia, which is indistinguishable by sight from iron-deficient anemia. Iron-deficient anemia can be related either to low iron or low copper making iron unusable. Low cobalt also can cause tearing from the eyes. Sheep and goats can pull cobalt from stores in the liver to make vitamin B 12 but they cannot use cobalt stored in the liver to put back into the rumen to support bacteria health. Cobalt must be taken orally on a regular basis for sheep and goats to survive. Cobalt toxicity is much less a concern in ruminants than other mammals. Ruminants tolerate high levels compared to needs, although young who do not yet have fully functioning rumens should not be fed extremely high amounts of cobalt.

Sulfur is also critical to digestion, a macro mineral needed for amino acid and protein production. It is important for wool, skin and nervous system health. Without proper amounts of sulfur, sheep and goats lose appetite and have poor quality wool growth. They may become susceptible to external parasites (like lice), salivate and have tears from the eyes. Excess sulfur will interfere with trace minerals, reduce rumen function and result in breath that smells like sulfur.

Many other minerals are important in digestion, including salt. Deficiencies and excesses will disrupt rumen bacteria and lead to poor health and possibly death.

Vitamins:

Walk into any pharmacy or big discount store and you will see aisles of vitamin supplement products. The array is dizzying and leads one to believe we would never survive without some bottle or liquid product. In both sheep and humans, there are certainly cases where supplementing vitamins in critical, such as when digestion is disrupted and the ability to make and absorb vitamins is diminished. In times of stress or illness, increasing need for vitamins makes supplementation a wise choice. However, restoring digestive function is the first step and reducing underlying causes of deficiencies should be next.

Sheep and goats make and absorb their B vitamins and vitamin C if they are healthy, with properly functioning digestive systems. This should meet their nutritional needs unless something changes substantially. During situations where digestion is poor (disease, parasites, stress), working on digestion while injecting vitamins is the quickest way to restore health. This is one of the only times I use injections; since the animal is not digesting properly, feeding the vitamins is a waste of time.

Vitamins A, D and E are fat soluble, meaning they are stored in the body, unlike vitamins B complex and C, which are easily flushed from the body and needed on a daily basis. Vitamin E, while fat soluble, is often considered more like a water soluble vitamin because it is not stored as well as A and D and may be needed on a fairly regular basis for health. Fortunately, forage usually meets the vitamin E needs of sheep. However, stored hay loses vitamins rather quickly and supplementation may be necessary during periods of prolonged hay feeding.

Vitamin D is made by the body in the skin and sunlight is needed for proper amounts. During long winter months or prolonged periods of confinement in buildings, sheep will need additional vitamin D. Vitamin D is critical for sheep to be able to use related minerals, like calcium, magnesium and the trace mineral boron. Vitamin A is generally adequate in forage but again, hay feeding means supplementation is necessary.

For short term oral supplementation of vitamins A and D, cod liver oil is a good source. Human-grade vitamin gel caps for vitamin E can be used and B complex or C capsules or liquid can be fed. Herbs containing high amounts of these vitamins are also a good way to get quality, easily-digested forms of the vitamins into sheep. Rose hips (*Rosa* spp), dandelion leaves (*Taraxacum officinale*), parsley (*Petroselinum crispum*) and nettles (*Urtica* spp) are all good sources of several key vitamins and minerals. Ideally, sheep should be healthy enough to make their own B vitamins and a mineral supplement can provide the fat soluble vitamins needed during winter.

Differing Needs by Species and Breed:

Goats and sheep are quite similar in how their digestion works and their mineral needs are also similar. However, there are differences in the amounts needed. Sheep need copper but there is a very fine line between enough and toxicity for sheep. Goats tolerate copper in higher levels. Some sheep breeds are more sensitive to copper and some store copper more easily than others. Because of this, mineral companies generally market sheep mineral that contains low or no copper. This may work well for most sheep breeds in most situations but it will not work well for goats or some sheep on some farms. It is worth doing some soil, forage and blood/liver testing to determine what minerals may be needed in a supplement for a particular farm.

Finding the Right Mix:

For over a decade, I have tried different organic mineral products in an effort to maintain health in my flock of Icelandic sheep, goats and llamas. As a naturopath and herbalist, I'm not content with products that do not meet nutritional needs or contain ingredients that are artificial and detrimental. As a shepherd, I am not willing to compromise on health and safety that lead to time, money and emotion lost on a flock of unhealthy animals.

I became frustrated after looking at label after label and not finding minerals that met the needs of my flock, farm and beliefs. I eventually began to mix my own minerals, using kelp, chelated minerals and vitamin supplementation, as necessary. I quickly realized that finding these products in small amounts to use for mixing was nearly impossible. After much discussion with some local mineral suppliers, I was able to source what I needed and get those products available to other shepherds who were unable to find what they wanted locally.

Putting It All Together:

After years of mixing my own minerals and helping other shepherds formulate a mineral plan that would work for them, I decided to have North Central Feeds produce and offer my mineral formula "Back in Balance™" for sale. The mineral is available in a goat formula that contains chelated copper and is appropriate for Icelandic sheep in most cases and a sheep mineral that has no added chelated copper. Horse mineral is also available.

Benefits of Back in Balance Mineral Formulas:

- Conveniently premixed in proper balance for most farms
- Available in amounts as small as 1 pound or whatever amounts are needed to meet your livestock nutrition needs
- Can be approved under certified organic programs
- Contain no artificial preservatives, flavor enhancers or molasses
- Contain chelated minerals needed for healthy growth, lambing, wool and milk production and reproductive health in the ewe and ram
- Contain sulfur for proper rumen function, healthy fleece and hooves
- Contain bioavailable cobalt for better rumen health, mineral absorption and digestion, improved growth, better fleece quality and less trouble with parasites
- Contain chelated copper for proper nerve function, lamb health, fleece quality/color and immunity
- Contain chelated selenium for proper immune health, reproduction, muscle health, healthy lambs and ewes during birth and lactation
- Contain organic kelp for natural trace minerals, palatability, natural source of iodine critical to thyroid health and all functions in the body
- Contain calcium and magnesium in proper ratios for health and growth
- Contain essential oils for palatability, better rumen function, antioxidant, antifungal (reduces yeast and mold counts), antibacterial and antiparasitic properties
- Contain vitamins A, D and E for proper mineral utilization, even during times of confinement or hay feeding

For more information www.backinbalanceminerals.com

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