



Photos by Author

Minerals for Sheep

—Ulf Kintzel

The high-wall rubber feeder has been my first choice for feeding minerals for 25 years.

Five years ago, I wrote an article for *Small Farms Quarterly* about the minerals I feed to my sheep and goats. This article can be found on my website. It is the one I point people to when being asked about what minerals I feed. There have been some changes in the past few years. Therefore, it is high time I update this article about minerals for sheep.

Why feed minerals to sheep in the first place? Many soils throughout the US are deficient in one trace mineral or another. The forage or grains grown in deficient soils will be deficient as well. A lack of certain trace minerals can cause all kinds of problems like neurological problems, fertility issues, allowing diseases to thrive, and in some cases, can even cause death. Feeding trace minerals prevents many problems in the first place.

Minerals should be given free choice and in loose form. Salt or mineral blocks are not very suitable for sheep since the intake would possibly be too little because of a sheep's small tongue. Various kinds of farm stores offer bags of sheep minerals. If you have a few sheep it is probably easiest to just feed these minerals. For a larger flock, these minerals can get pricey. Why? I will give you three reasons. First, ready-to-use minerals contain various vitamins. Sheep, like us, do need vitamins. The list of vitamins is Vitamin A, B, C, D, E and K. Sheep can get A and E from feedstuff. Vitamin D will be synthesized when the sun shines on the forage and the sheep. Vitamins B and K get made

in the rumen by the rumen bacteria and is passed on through the milk to the lambs that are too young yet to generate it. Vitamin C is synthesized in a sheep's tissue. Only if you keep your sheep a prolonged time in the barn and possibly feed feedstuff that is older than a year or of poor quality and has lost vitamins, then it may be necessary to feed vitamins. In the meantime, they are always added to sheep minerals and they do cost money.

Secondly, ready-to-use sheep minerals contain several essential macro minerals (or macro elements) like calcium (Ca), phosphorus (P), potassium (K), sulfur (S), and magnesium (Mg). Under normal circumstances, they are present in soils and feedstuff and do not need to be supplemented. If you are one of those farmers who just jumped up yelling at me because he or she has deficient soils and is lacking one or the other macro element, please note that I wrote the qualifier "under normal circumstances." I have not heard of deficiencies in sheep under good farm management due to a lack of any of the macro minerals I listed. However, the macro elements that are not present in soils and need to be supplemented are sodium (Na) and chloride (Cl). NaCl is salt, plain old table salt. It can be purchased as livestock salt in a 50-pound bag, and it is also the main ingredient of a bag of trace minerals.

The third and last reason for sheep minerals being pricey is the fact that they often contain additives like corn distillers dried grains and sugar cane molasses. While these ingredients do not cost a lot, they increase intake well beyond of what the animals need, leading to

what is called a “luxury consumption.” A lot of it then goes back out in the manure afterwards. You can remedy that problem somewhat by mixing an equal amount of loose salt with sheep minerals. It will reduce intake without much of a risk of deficiencies developing. A long time ago, I used to do exactly that for many years, but searched for options that promised greater savings.

Farm stores often also offer trace minerals, usually in a 50-pound bag. Trace minerals are also called micro minerals. They are called that because animals need very little of them. The amount in your bag of trace minerals is usually measured in ppm—parts per million, with the notable exception of regular salt. The trace minerals needed by sheep are iodine (I), selenium (Se), manganese (Mn), iron (Fe), copper (Cu), cobalt (Co), zinc (Zn), and molybdenum (Mo).

Some of these trace minerals are of utmost importance to be supplemented because they are very often deficient in soils in many parts of the United States, or they are present but are fixed and thus not available to the plants your sheep will eat. A deficiency of these trace minerals can have devastating effects. High on the list is iodine. A severe lack of iodine leads to a lack of thyroid hormone production. The most notable sign is a goiter in the throat area. Lambs born with that symptom will die.

Another very important trace mineral is selenium. A deficiency of that element can cause white muscle disease, which can cause the sheep to lose its ability to walk or the heart becomes weak, and it dies. In conjunction with vitamin E, selenium affects other physiological processes as well, i.e. fertility. In short, this trace mineral is very important but rarely sufficiently present in the soil.

Some trace elements—and here it does get complicated—that aid the absorption of other important trace elements or counter the absorption. Molybdenum, for instance, reduces copper accumulation in a sheep’s liver.

Other common trace minerals needed are iron, zinc, manganese, and cobalt. They are mostly present in soils, but in certain areas they may not be. However, they

are standard in trace minerals anyway.

And then there is copper. If you already raise sheep, you have probably heard the warning to not feed added copper to your sheep. People get confused and think this means not feeding any copper to sheep. I wrote two articles about feeding copper to sheep, which are posted on my website. In short, sheep cannot rid themselves of excess copper as easily as other animals can. Instead, it gets stored in the liver. In times of stress, it gets released into the bloodstream and poisons the animal. At that point death is almost certain.

I started feeding minerals containing copper after I lost dozens of lambs to copper deficiency 21 years ago. Currently, my mixture of trace minerals, which I will describe later in this article, contains 150-ppm copper. I feed it throughout the year. If you calculate 10 grams of trace mineral intake per day, which is at the high end of intake, with 150 ppm of copper, it will equal the amount of copper in two pounds of shelled corn. That is what I calculated. Since I am not feeding any grain, I figured I am safe with this level of copper, which is very much needed in many processes in the development of sheep. Since I started feeding copper, I lost two sheep on two different occasions during a time period of twenty years to copper poisoning. Both were Texel crosses. Texel sheep are said to be more sensitive to excess copper than other breeds.

However, I have had no losses in my White Dorper flock due to copper poisoning.

Goats are on the other extreme of the spectrum. They are highly tolerant of copper and they need a lot more of it in their physiological processes than sheep do. I run my few goats with my sheep, and they feed on the same mineral feeder as the sheep do. I solve that discrepancy problem by giving my goats a slow-release copper bolus containing copper oxide, every eight to twelve months.

Currently, I use Champion’s Choice® Selenium ‘90’ Trace Mineral Salt and mix it at a 50/50 ration with Mix-n-Fine® Salt or Morton Fine Solar Salt, whichever of the two is available at the time. That brings the copper content down to the desirable 150-ppm and keeps the selenium content at



Storing my mineral mix.



A bag of loose salt and a bag of trace mineral salt, containing selenium and other trace minerals.

45-ppm, which is still plenty. I use these two because they are readily available to me. Your feed store may offer a different brand of trace minerals or a different brand of livestock salt. Perhaps you are even able to source livestock salt with iodine. Whichever brand of trace minerals is available, and you are willing to try, make sure it contains selenium. Yes, I consider selenium that important. When mixing plain salt with your trace minerals, all other trace minerals will be “diluted” to a level that is still comparable to ready-to-use sheep minerals. However, they are, except for iodine, minerals I am a bit less worried about since they are more likely to be present in my soils. I have been offering these minerals free choice daily for several years now. Not having encountered any deficiency problems for many years, I am happy with the results as well as the cost.

Prior to that I used the Selenium/Iodine Premix sold by Pipestone Vet Clinic. I stopped using it after I encountered an iodine deficiency in several newborn lambs. They had a goiter and died shortly after birth. I heard through others that this problem was acknowledged and solved. The mix is now being sold by Premier One Supplies as Sheep Trace Mineral Premix. Unlike the trace minerals I use, these also contain molybdenum but don't contain much copper, if any. The premix comes in a five-pound bag and is very reasonably priced. You mix one pound of it with a fifty-pound bag of plain livestock salt and you have all the minerals you need if you are not concerned about copper. I am sure this is a very adequate mix. If you are concerned about copper, you can always mix in some trace mineral salt, with or without selenium. The premix is high in selenium already.

I want to address two recurring questions about mineral feeding that I am often asked. I know my answers will not be the most popular among some of my readers. The first one is about kelp and what I think about it. I understand it is rich in minerals, but I don't think it contains enough selenium. As I see it, kelp does not offer anything that more conventional options, including options for organic farms, offer. I do know kelp is incredibly expensive and since I am incredibly cheap, I would not consider it.

The second question is about offering individual minerals separately in individual containers in a buffet-style or cafeteria-style manner. (This should not be confused with giving minerals free choice, which means making minerals always available without restricting



Getting ready to mix the salt with the trace mineral salt.

access to them.) The theory is that the animals know best which mineral they need because they become or are deficient of it in their body and will eat trace minerals according to their needs. This assumes an ability in a sheep (or a different kind of animal) that you and I don't have. I do not think animals can distinguish between

individual trace minerals well enough to consume them only according to their needs. I know they instinctively seek salt when they need it. I know they seek fiber when the pasture is too lush. But assuming they will, for instance, deliberately seek selenium and not copper is a bridge too far for me. There is no scientific or empirical evidence for that. No credible field trial has suggested that animals have that ability. I will stick with my trace mineral mixture, which has provided good results for me without any negative effects at the lowest cost possible.

Over time, I established my own method of mixing and storing my trace minerals. I collected a great number of cat litter buckets with a lid. They were given to me by someone who owns cats. However, any bucket with a good lid will do. I pour a certain amount of my trace mineral salt in several buckets and top it off with an equal amount of salt. Then I pour the content back and forth into another empty bucket until everything is well mixed. At times, I give that job to my children. That's what children are for, right? Expect some spillage though when they do it! Then I store my minerals in that battalion of buckets. I do that every few months, perhaps four or five times annually. It takes me half an hour if I do it and only five minutes when my children do it and an additional minute afterwards for scolding them for the spillage, even though I had stressed it during my five-minute instruction speech.

I feed my minerals free choice in a high-walled rubber pig feeder. I set two feeders into each other to give them some weight, which reduces the risk of being tipped over. I tried several other methods of feeding minerals, but always came back to these feeders, which are by now well over 20 years old. I remove the feeder when it is supposed to rain, but at any other time, it sits in the pasture. My cat litter bucket with a lid and filled with my minerals sits on my water trailer, always present when I need to refill minerals. Consumption of minerals varies greatly. It is highest at the onset of spring when I start grazing. At other times, it may go down to almost

zero, but even during the same season, consumption spikes at times and then goes down again significantly. There may be overconsumption of certain trace minerals at certain times. However, the salt in the trace minerals limits intake, which prevents individual trace elements from being eaten at toxic levels. The additional minerals are simply excreted.

What is my cost? I spend less than \$250 for a flock that varies in size between about 200 animals in the winter and close to 500 in the spring and summer, when

consumption is highest. That means I spend less than \$1.25 annually for any adult animal.

Do you find my method of feeding minerals too complicated? It may sound that way at first glance, but I assure you it really isn't. However, if I cannot convince you, there always is the option of buying and feeding ready-to-use sheep minerals. As far as minerals are concerned, you will not go wrong. You will just spend significantly more money than I do. 🐑