Dr. DEER

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Large numbers of "mineral blocks" are placed in the woods by landowners and hunters each year. But do they provide what deer need? PHOTO BY GORDON WHITTINGTON

MINERALS DEMYSTIFIED PART 2

Last month, we began our look at the many minerals that play a role in whitetail health. We focused mainly on macro-nutrients, which the body uses in relatively large amounts. Now it's time to turn to an often overlooked category of minerals that likewise are critical to the herd's well being: micro-nutrients.

From a whitetail's perspective, the minerals in this category include selenium, cobalt, copper, zinc, iodine, iron, manganese, molybdenum and chromium. While all play key roles in the animal's health, it's important to keep in mind that they're categorized as *micro*-nutrients because deer don't need them in heavy doses. In fact, too much of any can cause real problems.

Last month, I mentioned a case in which a deer breeder added far too much selenium to his herd's diet. In the process, he nearly killed his largest buck. Granted, that was in a captive situation, with the breeder totally controlling what the buck ate; however, the principle of avoiding oversupply also applies in the wild.

Selenium is a powerful antioxidant thought to play a role in eyesight, liver function, hair growth, heart health, skin health and cell division. This element also has a strong influence on antler development and sperm production, which likely is at least part of the reason the breeder provided it in excess. The problem is, deer have a narrow tolerance for this heavy metal.

If you take plugs out of a growing antler (as we have at our Institute for White-tailed Deer Management & Research), you'll find higher concentrations of selenium in the rapidly growing portions. Absorption of selenium is much lower in deer than in non-ruminant mammals. The normal liver concentration of selenium for whitetails is 0.2 to 1.1 mg/kg. One case in Canada involved selenium toxicosis in whitetails with liver concentrations of 3 to 9 mg/kg selenium: many times the norm! You can see how easy it would be to poison deer with even a slight miscalculation of selenium

concentration for a supplement.

Unlike most other ruminants, such as cattle, sheep or goats, whitetails have a high need for copper. In fact, it's been my unpopular opinion for some time now that certain cases of chronic wasting disease in whitetails are related to copper deficiencies. Copper plays a role in a deer's formation of flexible connective tissue and in the functioning of muscles, nerves and the immune system. A copper deficiency also can cause weakened heart and blood vessels. You can see why getting the copper intake right is important.

Where legal, providing wild deer with supplemental feed is an area of growing landowner and hunter interest. On numerous occasions I've seen people act as though deer are goats or sheep and feed them accordingly. In reality, those animals can't tolerate the levels of copper needed by deer; thus, giving sheep/goat feed to whitetails can create a copper deficiency. Normally, copper should be supplied at a rate of 24-40 ppm. Deer have tolerated experimental rations with as high as 200 ppm copper, but I wouldn't recommend providing it in such large amounts.

Zinc is always busy helping to produce cells to keep deer healthy. It aids in enzyme activation and is essential to the first stage of annual antler growth. Healing, development, pregnancy and lactation also are situations in which there's an increased need for zinc, due to increased cell division.

As this is another heavy metal, you need to be very careful not to over-feed it. Recommended levels are about 115-200 ppm, with tolerances up to 1,000 ppm. Again, I wouldn't advise using the higher level.

The remaining micro-nutrients on our list also need to be discussed, though they're used in even smaller quantities than those described above.

Cobalt is found in Vitamin B-12 and is critical to all growth processes, plus digestion and most importantly rumen function. Cobalt works hand in hand with the bacteria in the rumen (first "stomach" chamber). Among other duties, these bacteria are responsible for making B-12.

Yet cobalt is needed in very low quantities by deer, probably as low as 0.04 ppm. Even so, cobalt deficiencies have been reported in 15 states, from Florida up to Maine on the Atlantic coast, as well as in Michigan, Wisconsin, Minnesota, Iowa, Missouri and Nebraska.

Iodine is used by the thyroid gland to produce thyroxin, which regulates metabolism, energy production, muscle tone, breeding and tissue damage repair. Normal range is 90-10 mg/kg for most supplements. But as with selenium, iodine can be toxic. Guard against using iodized salt, and always consider the iodine level along with other iodine supplements.

Manganese seldom is limiting to whitetails. However, it's important for respiration, growth and reproduction. It's very important in calcium stabilization, phosphorus metabolism and bone formation. Manganese requirements are about 40 mg/kg of dry matter intake.

Molybdenum also can be quite important, though overabundance can cause a build-up of toxic nitrates in the body. It also can affect copper availability, causing deficiencies even when adequate copper is present. As far as I know, there never has been a scientific report of molybdenum toxicity in native forages, but there have been many involving supplements! The known molybdenum requirement is a scant 1mg/kg, making proper calculations very important.

Last on our list is a very familiar element: iron. Both iron and cobalt deficiencies cause anemia. Milk is low in iron, which I feel is one reason fawns begin eating vegetation at only a few days of age. Most plants provide adequate iron, and the only time I've seen issues caused by a lack of this element has been with food plots grown on iron-deficient soils. The known requirement for iron is about 30 mg/kg dry matter intake.

IN CONCLUSION

I know not everyone is a chemist, and some of this two-part discussion of minerals is a bit tedious, if not downright hard to follow. However, there's a method to my madness here. I want to get across to you that supplementing the whitetail's diet with various nutrients really is a serious matter.

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Because of how delicate the balance of some micro-nutrients is in a whitetail's system, this is one of those areas in which I'd advise laymen not to develop their own supplements. Unfortunately, many landowners and hunters persist in coming up their own "secret" formulas for deer supplements. While their interest in helping the herd is commendable, formulating mineral mixes is one aspect of management we should leave to the experts. As noted, some micro-nutrients are toxic if a deer takes in too much of them.

With such a large number of nutritional supplements for deer out there, it can be confusing to figure out which ones are good and which ones aren't. I hope in this series I've helped you learn the right questions to ask about a product before buying it.

Mineral supplementation can work, but the only way you can know what to provide is to first identify if there is indeed a deficiency on your land. And the best way to do this is to consult with a professional agriculturalist who has experience with your soils and geographic location. Again, it's far better to be safe than sorry.